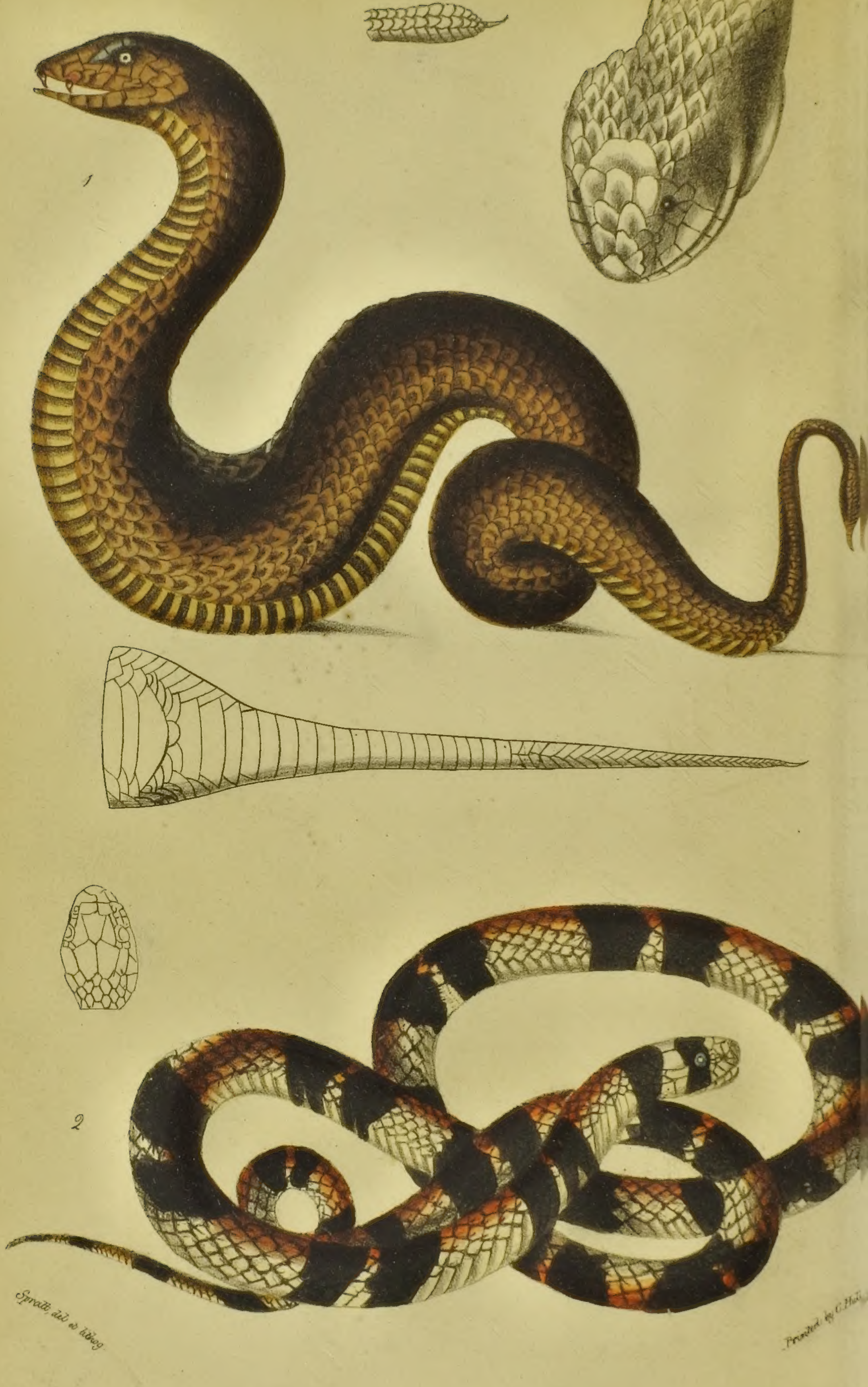


1. Acanthophis Brownii. || 2. Elaps lemniscatus.

London Published by John Wilson, Princes Street, Soho, April, 1831.

MEDICAL ZOOLOGY,

AND

Mineralogy;

OR

ILLUSTRATIONS AND DESCRIPTIONS

OF THE

ANIMALS AND MINERALS

EMPLOYED IN MEDICINE,

AND OF THE

PREPARATIONS DERIVED FROM THEM:

INCLUDING ALSO

AN ACCOUNT OF

ANIMAL AND MINERAL POISONS:

WITH FIGURES COLOURED FROM NATURE.

BY

JOHN STEPHENSON, M.D. F.R.S.

AUTHOR OF "MEDICAL BOTANY."

LONDON:

JOHN WILSON, PRINCES STREET, SOHO.

1832.

29176

LONDON:
PRINTED BY DIGGENS AND JONES, LEICESTER STREET.

DEDICATION.

TO THE RIGHT HONORABLE

HENRY LORD BROUGHAM AND VAUX,

BARON BROUGHAM,

OF BROUGHAM, IN THE COUNTY OF WESTMORELAND,

LORD HIGH CHANCELLOR OF GREAT BRITAIN.

An early and intimate acquaintance with that portion of our country (Westmoreland), which will in future years derive an additional degree of celebrity from the name of "Brougham," by enabling me to bear testimony to the virtues which adorn your Lordship's private life, must plead, both with your Lordship and the public, for my presumption in gracing this work with a name so illustrious.

It is not to your Lordship as a Statesman that I dedicate the following pages; I presume not to praise or even properly to appreciate that transcendent genius,

which has dispersed the bigotry of ages and raised your Lordship to your present rank in society: my studies, while they have incapacitated me from making the just distinctions between your Lordship and many of your predecessors, enable me to form a just estimate of that combination of talents which have rendered your Lordship an object of equal admiration to the Politician and the Philosopher.

To the Patron of Science and the Friend of Mankind, I inscribe this work, in the fullest confidence that the fame of your Lordship will last as long as the glories of England shall remain the subjects of history or tradition.

JOHN STEPHENSON.

LONDON, March, 1832.

PREFACE.

The useful and powerful aid which the modern practice of medicine has received from many substances in the Animal and Mineral Kingdom, is a fact too well known to require elucidation: and that no publication has hitherto appeared in this country on a subject so generally useful, has excited the surprise of all who are acquainted with medicine as a science.

The Author, in presenting to the public this Work, which may be considered as a continuation of a former one by Mr. Churchill and himself, trusts that in some measure he has succeeded in accomplishing what has been so long desired. The reader will likewise find that it renders complete the works which others have written on the subject of Medical Botany.

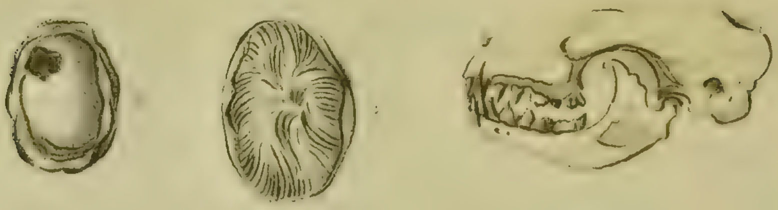
To the account of each Animal and Mineral substance are appended the characters of the genus and species to which they belong, to this is added the English, provincial and foreign names; a copious list of synonymes; physical, chemical, and medical properties and uses. The medical reader will find every substance retained in modern practice has been fully and, the Author would

fain hope, accurately described. An account of all the most important Animal and Mineral Poisons was required to render the work complete; these have been added, with the same attention to authorities, as will be found in other parts of the work.

Many of the Lithographic Illustrations are from original drawings made expressly for the work, and several of them represent species never given before. To the account of most of those minerals that assume regular forms, the figures of the primitive, and to some of the most important, the secondary forms are annexed: the time necessary to delineate them by geometrical projection, could not be given, and that errors in some of the figures, (owing to the carelessness or ignorance of the artists) will be observed there can be no doubt; but the Author trusts that all who know the difficulty of procuring an artist who, in delineating a subject, can unite facility of execution with scientific knowledge, will make due allowance for any trifling inaccuracy which arises from a cause over which he had no control.

The Author cannot conclude this short address without acknowledging the ready access that has been afforded him to the magnificent collection of Minerals and other objects of Natural History, in the British Museum. To Thos. Bell, Esq. F.R.S. of New Broad Street, who kindly favoured him with several rare specimens of Poisonous Serpents, he returns his most sincere thanks.

Moschus Moschiferus.



Viverra Civetta.

London, Published by John Wilson, Frances Street, Soho, Jan.y 1st 1831.

MEDICAL ZOOLOGY

AND

MINERALOGY.

PART I.—THE ANIMAL KINGDOM.

Class I.—MAMMALIA.

Vertebrated animals, with red and warm blood, breathing by means of lungs, viviparous, and suckling their young with milk formed in their breasts or mammæ.

I.

MOSCHUS MOSCHIFERUS.

Thibetian Musk.

Order Pecora, *Lin.* Ruminantia, *Cuv.*

Gen. Char. *Incisors* $\frac{0}{8}$; *canines* $\frac{1}{0}$—$\frac{1}{0}$; *molars* $\frac{6}{6}$—$\frac{6}{6}$= 34. *Canines* wanting altogether in the females; superior canines projecting from the mouth in the males; *ears* long, pointed; *body* slender; no *horns*, or antlers; *feet* with hoofs; *tail* very short.

SPEC. CHAR. *Fur* of a grey brown; *hair* coarse; a sac or follicle before the prepuce filled with an unctuous musky substance; *size* of the roebuck.

Moschus capreolus; *Gesner*, *Quadr.* 695. Animal moschiferum; *Raii Hist. Quadr.* 127. *Johnston*, *Quadr. t.* 29. *Schroeck*, *Hist. Moschi*, i. t. 1. Capra moschi; *Aldrov.* 743. Tragus moschiferus; *Klein*, *Quadr.* 18. Le Musc; *Buffon*, *Hist. Nat.* xii. 361. *and Suppl.* vi. 221. t. 29. Moschus moschiferus; *Syst. Nat. Gmelin*, i. 172. *Shaw*, *Zool.* ii. 249. t. 171. Thibetian Musk; *Pennant*, *Hist. Quadr.* 1. 124.

Le Musc, Fr.; *Il Muschio*, It.; *El Almizcle*, Sp; *Das Bisamthier*, Ger.; *Desmerdyret*, Dan.; *Desmansbock*, Swed.; *Kabarga*, Rush.; *Meshk*, Arab.; *Xe*, Chin.

THE valuable and powerful aromatic substance from which this animal takes its name, was long known and highly prized as an article of the materia medica, before any certain account of the animal itself had been obtained by naturalists. Resident in the remote parts of Asia, and inhabiting the wildest and most elevated regions, it was considered only as an object of the chase, and confounded with the different species of deer and antelopes, with which in manners and habit it is so nearly allied. It appears to have been unknown to the ancients; and although the drug which this animal yields was employed from time immemorial, no notice of the species to which it belongs existed, till Abuzied Serassi, an Arabian author, described it as a deer with horns. Serapion, who flourished about the end of the eighth century, was the first who introduced a knowledge of the animal into western Europe. Avicenna, Gesner, Aldrovandus, and others followed; but Grew gave the first satisfactory description.

The Thibetian Musk resembles the roe-buck in form but has no horns, and scarcely any tail. It measures about three feet four inches in length, and weighs from twenty-five to thirty pounds. It is somewhat more than two feet in height, with the hind considerably longer than the fore legs; which circumstance enables it to make prodigious leaps. The eyes are destitute of a lachrymal sinus; they are large with a rufous brown iris; the ears are three inches in length, pointed, erect, like those of the rabbit, furnished internally

with long white hairs, blended with others of a greyish tinge, and, externally, with hairs of a reddish black, mixed with grey. The upper jaw, in the male, is provided with two very long canine teeth, projecting from the mouth, curved inwards, and sharp on the inner side; at the angle of the gape are two tufts of stiff hair. The fur is coarser than that of the stag, varying at different seasons of the year, and different periods of life. The prevailing colour of the hair on the body is dark brown, cinereous at their origin, with brown, ferruginous, or blackish tips, presenting different hues, according to the position in which the creature is viewed. The hoofs are deeply cloven, slender and black; the succentorial ones are likewise very long, serving the animal to grasp the edges of rocks, in climbing or descending, in the same manner as the Chamois. In the male, behind the naval and before the prepuce, there is situated an oval bag, flat on one side and convex on the other, about three inches long and two broad, projecting, with a very small orifice, beset with short hairs. In the young animal, it is empty; but, in the full-grown individual, it contains from one to two drachms of a soft unctuous brown substance, of the most powerful and penetrating smell, which is the genuine musk. The female has two mammæ; is smaller than the male, and not only wants the long projecting canine teeth, or tusks, but the follicle. Le Peyronie has given in the Receuil de l'Acadamie des Sciences, an anatomical description of the Musk Deer, made probably from the individual in the menagerie at Versailles. The drawing, on the annexed plate, was made from a specimen in the British Museum; and, Figs. 1 and 2, are intended to represent different views of the musk bag, from Buffon.

The Musk is an inhabitant of the alpine tracts of Central Asia, particularly those which divide Thibet from India, where it is called *Kustura*. It is also found in the kingdoms of Bontan and Tonquin, in several of the Chinese provinces, in Chinese Tartary, and even some portions of Russian Tartary, as about the lake Baikal, and the rivers Jenesi and Argun, from lat. 60° to 45°, but seldom so far south, except driven by great falls of snow to seek for food in more temperate climates. Its favourite haunts are the tops of mountains covered with extensive forests of pine trees, where it delights to roam in places of the most difficult access, springing

from rock to rock with great agility, and, when pursued, taking refuge in the highest and most inaccessible summits. It lives retired and solitary, except when large flocks collect, in order to change their residence, being driven southward by the approaching cold. During this migration the peasants lie in wait for them, and either take them in snares, or kill them with bludgeons and arrows. Though timid and gentle in their wild state, they are never reconciled to domestication, and pine and die in confinement. Daubenton, however, mentions one which he saw at Versailles, in 1772, where it lived three years. They feed on roots, and the tender branches of shrubs and trees, and are particularly fond of lichens, arbutus, rhododendron, and wortle-berry plants.

The flesh is eaten by the natives notwithstanding its strong flavour of musk, and the skins are manufactured into bonnets and winter dresses, by the Tungusians and the Russians; but the animal is chiefly hunted for the sake of the perfume. It is chiefly in the rutting season that the bag of the animal becomes filled with musk, when it diffuses a very strong and penetrating odour. At that period, irritated by its abundance, the creature rubs itself against rocks and trees, and thus occasionally ruptures the bag, and the musk escapes from it. The musk thus ejected is carefully gathered, from the places where it occurs, as it possesses in a very eminent degree, all the peculiar qualities of the musk; that which is taken from the bag, not being always mature.

According to Tavernier, the best and greatest quantity of musk comes from the kingdom of Bontan, whence it is carried for sale to Patna, in Bengal. After killing the animal, the peasants cut off the bag, which is about the size of a pigeon's egg, and is situated nearer the organs of generation than the navel. As soon as the bag is cut away, a small hollow reed is inserted into it, that the musk may not suffer, which it would be apt to do from want of air, and the whole is tied round with a sinew of the animal.

Musk is brought to this country from China, in caddies, which contain from twenty to sixty and an hundred ounces each. The Tibetian is considered by far the best, but an inferior sort is imported from Brasil, and a still worse from Russia. The best is that which is in the natural follicle, or *pod*, which is a small round bladder, of a brownish colour, lined with a very thin membrane,

and covered externally with coarse hairs. As it is a very high priced article, it is frequently adulterated by a mixture of dried blood and asphaltum; and sometimes the bag is punctured in several places, and lead, sand, and other heavy matters introduced. The presence of dried blood may be suspected, by its emitting as it inflames, a fœtid smoke; and asphaltum is discovered by its melting, and running before it inflames if thrown on a hot iron; whereas genuine musk inflames without running and leaves only charcoal.

Musk, when pure, appears in small lumps or grains, of a deep brown colour, resembling coagulated blood; feels unctuous to the touch; has a strong, peculiar, aromatic, diffusible odour; and a bitterish sub-acrid taste. It is a most powerful and durable perfume, and a few grains of it will yield an odour for years, without any sensible diminution in weight or power. So powerful, indeed, is the smell of musk, when fresh taken from the animal, or from quantities put up by the merchants for sale, that it has been known to occasion hæmorrhagies from the nose, eyes, and ears, of those who have imprudently inhaled its vapours; and we are assured by Chardin, that whenever he was engaged in making purchases of musk, he always found it necessary to cover his face with several folds of a handkerchief, in order to be sufficiently secure against the sudden effects of the perfume. The odour of this substance is most agreeably developed when mixed with certain other perfumes, as civet, ambergris, lavender, &c. Musk yields part of its active matter to water, by infusion; alcohol, takes up most of its active parts, though the odour is only discovered upon dilution, and sulphuric ether dissolves it almost completely. The watery infusions are decomposed by the oxymuriate of mercury, sulphate of iron, nitrate of silver, and the infusion of yellow bark. Musk, as Dr. Duncan justly observes, is seldom met with in commerce in a perfectly genuine state, but always more or less sophisticated; hence, the great diversity of the results of its chemical analysis. From the very sensible ammonaical odour which it emits, it has been concluded that it is a resinous body combined with a volatile oil and mucilaginous extractive matter. M. Nysten, (*Dict. de Med.*) states it to consist principally of a volatile oil, a resin, and adipocere; but I do not know whether he has arrived at this

conclusion from his own experiments. Thieman,* a Prussian chemist, has given a very minute analysis both of the Tonquin and Siberian musk. In 100 parts of the former he got carbonate of ammonia, 10; wax, 9; gluten, 50; albumen and membranes, 30; muriate and carbonate of soda, 1; with traces of potass; but he was not able to procure any essential oil.

Musk is not confined solely to the animal we have been describing, but exists, under various modifications, in several others. It is found in small quantity in the Cape Gennett *(Viverra Genetta,* L.*)*, and the odoriferous substance yielded by the Civet, is in many respects analogous to musk. The flesh of some animals, as the Pecari, or Mexican Hog (Sus *tajassu*), and of the Musk Ox, (Bos *moschatus*) has a strong flavour of musk. Man himself, under certain circumstances, gives out a smell of musk: Haller remarked it in the perspiration; Merat perceived it in the bile; and Cartheuser observed the analogy between some productions of musk and the odorous part of urine. A great variety of plants, differing widely from each other in their botanical characters, smell powerfully of musk. Among these are Centaurea *moschata,* Adoxa *moschatellina,* Aster *argophyllus,* Mimulus *moschatus,* and many others.

Medical Properties and Uses.—As a medicine, musk is held in high estimation in the eastern countries, and has now been introduced in pretty general use among European practitioners, in the treatment of the greater number of spasmodic affections, and also in diseases of debility. The Greeks and Romans were not acquainted with musk, even as a perfume; the Arabian writers first mention it about the eighth century, and its properties as a medicine were not known before the time of Aëtius. With respect to its medical virtues, it is a powerful stimulant and antispasmodic, promoting the secretions, raising the pulse without heating the body, relieving spasm, and increasing the energy of the brain and nervous system. By some practitioners it has been most highly extolled as a very powerful agent for relieving the low delirium, subsultus tendinum, hiccough, and other symptoms of a spasmodic nature, which supervene on the more advanced stages of continued and exanthematous fevers. It is, however, principally employed

* *Berlinische Jahrbuch der Pharmacie*, 1803, p. 100.

as an antispasmodic, in various convulsive diseases, especially in hysteria, epilepsy, tetanus, and as a stimulant in retrocedent gout. In cholera, it is given with the view of checking vomiting. Combined with ammonia, it has been celebrated for its power of arresting the progress of gangrene, and in this form the late Mr. White of Manchester administered it with great advantage in sloughing phagedenic ulcers, and in sphacelus, particularly in elderly people. It is much employed by the Hindoo physicians, as an antidote to hydrophobia; and if we are to believe a paper inserted in the Philosophical Transactions for 1745, by Reid, no other remedy is employed at Tonquin than musk, against the bite of a mad dog. In the Tonquin specific it is combined with cinnabar, and is exhibited in large doses, frequently repeated; but Alibert* mentions having seen it given in hydrophobia without effect. Hillary says in these cases it acts as a sudorific, and Gmelin † regarded it as a specific antidote. Its dose is from five grains to half a drachm, repeated every five or six hours, in the form of a bolus. To children it has been recommended by Dr. Murray, under the form of enema, as a remedy in the convulsions arising from the irritation of dentition. Dr. Duncan says the best preparation is the tincture.

Off. Prep.—Mistura Moschi, L. Tinctura Moschi, D.

VIVERRA CIVETTA.

African Civet, or Civet Cat.

Order Feræ, *Lin.* Carnasiers, *Cuv.*

Gen. Char. *Incisors* $\frac{6}{6}$; *canines* $\frac{1}{1}$—$\frac{1}{1}$; *molars* $\frac{6}{6}$—$\frac{6}{6}$= 40. From four to six molars on each side in each jaw; *head* long; *muzzle* pointed; *tongue* bristling with papillæ; *feet* pentadactyle; *claws* semiretractile; a pouch under the anus, containing a thick and very strong scented liquor.

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* *Matere Medicale*, v. ii. 550.

† *Diss. de specifico antidoto novo adversus morsu canis rabidi*, Tub. 1750.

SPEC. CHAR. *Tail* with four or five annuli, brown towards the tip; *fur* grey with brown or black stripes and spots; a *mane* along the dorsal line.

Civetta; *Clusius, cur. post.* 57. Felis Zibethi; *Gesn. Quadr.* 836. Animal Zibethi; *Aldrov.* 340. La Civette; *Buffon, Hist. Nat.* ix. 353, t. 34. Viverra civetta; *Shaw, Zool.* i. t. 95. *Syst. Nat. Gmelin*, 1. 80.

La civette, Fr.; *Zibet*, It.; *Zibetto*, Sp. and Port.; *Die Zibetlkatze.* Ger.

THIS animal, which is remarkable for the production of the perfume which bears its name, is rather more than two feet in length, exclusive of the tail, which is about fourteen inches. The ground colour of the body is a brownish grey, marked with numerous transverse interrupted blackish or dusky bands, narrow and parallel with each other on the shoulders, larger on the body and on the thighs, and which are sometimes so much approximated and curved as to form eye-like spots, like those of the panther. The tail is marked with four or five rings of a blackish brown colour, and its extremity for about six inches, is entirely black. The hair is coarse, and stands up along the back so as to form a kind of mane, which may be raised or depressed at pleasure. The body is thickish; the claws half retractile; the ears short and rounded, and the nose sharp and black at the tip. The legs are black; the upper lip and sides of the neck nearly white. A large patch of black surrounds each eye, and passes from it to the angle of the mouth, and two or three bands of the same colour pass obliquely from the base of each ear, and end at the throat and shoulders. The tongue is very analagous to that of the common cat, being furnished with many small elevated and pointed papillæ. In addition to the six incisors and two canines, which are common to the whole of the true carnivora, it has on each side and in each jaw six molars, one of which is strong and adapted for lacerating flesh, while the others are more or less of the ordinary form. The most distinctive character, however, of the Civit is the organization of the bag containing its peculiar scent. It opens by a narrow cleft, situated between the extremity of the rectum and the parts of generation, in both sexes. This cleft, says Baron Cuvier,

conducts into two cavities, which might each of them contain an almond. Their external surface is slightly covered with fine hair, and pierced with many holes, each of which conducts into an oval follicle, of very slight depth; the concave surface of which is again covered with innumerable pores. The odoriferous substance comes from these pores. It fills the follicle, and when this is compressed, it proceeds from it something, in form, like vermicelli, and enters the larger bag. All these follicles are enveloped by a membranous tunic, which receives many of the sanguineous vessels; and this tunic, in its turn, is covered by a muscle, which arises from the pubis, and has the power of compressing all the follicles, and with them the entire bag, to which they are attached. By means of this compression, the animal gets rid of the superfluous part of its perfume. Besides this odoriferous matter, there is another secreted, which assumes the form of stiff silken threads, and is mingled with the first. There is also in the Civit, a small hole on each side of the anus, from which a blackish and very fœtid matter issues.—Fig. 1, Plate I. represents the skull of the Civet.

The Civit inhabits Africa, and several parts of Asia, where it is very prolific; yet in more temperate regions, though it lives, and apparently enjoys perfect health, it will not breed. In its natural habit the Civet closely resembles the fox, subsisting on birds, and the smaller quadrupeds, which it takes by surprise, and sometimes commits depredations among poultry, when it will steal unperceived into a farm-yard. In the East and in many parts of Northern Africa, great numbers of them are kept in a state of domestication for the purpose of obtaining their perfume, which is much esteemed, and bears a high price. Buffon affirms that, in Holland, the Civet is put into a long wooden cage, so narrow that the creature can not turn itself round. This cage being opened by a small door behind, a spoon or spatula is introduced into the orifice of the pouch, carefully scraped, and its contents put into a proper vessel. This operation is repeated two or three times a-week; the quantity procured at once is from two scruples to a drachm; and the animal is said to produce most after being teazed or irritated.

Genuine civet is of a yellowish or brownish colour, of an unctuous consistency, and a strong smell, far from agreeable when undi-

luted, but highly fragrant when mixed in very small portions with other perfumes. Its taste is bitterish and subacrid; it unites readily with both the volatile and fixed oils ; it is sparingly soluble in water and alcohol, but impregnates these fluids strongly with its odour. M. Boutron-Chalard states, that in an unexceptionably good civet, he found free ammonia, stearine, elaine, mucus, resin, volatile oil, yellow coloring matter, carbonate and phosphate of lime, and oxide of iron.* If paper be rubbed with civet, and it will bear writing on afterwards, it is considered genuine.

Civet is principally imported from India and Africa into Europe, by the way of Alexandria and Venice. The Dutch civet is said to be generally less adulterated than that which is brought either from India or the Levant; and its average value in Holland, may be stated at fifty shillings the ounce.

Medical Properties and Uses.—This substance agrees with musk in its medical virtues, and was formerly administered in the greater number of spasmodic diseases, especially in epilepsy, hysteria, colic, and even as a remedy against barrenness. "Si vir ante concubitum, glandem Zibetto inungat, cum odore illius uterus delectetur, citius eum semen excipere, plerique docent."† It is now very rarely, if ever, employed in medical practice; while musk, ambergris, and other drugs, have considerably diminished its reputation as a perfume.

VIVERRA ZIBETTA.—*The Zibet.*

Spec. Char.—*Fur* grey ; *legs* transversely spotted with brown ; *throat* white, with two black bands on each side ; no *mane ; tail* long, with eight or nine rings.

Viverra Zibetta; *Syst. Nat. Gmelin*, 1. *Shaw*, *Zool.* i. 389. Zibet; *Buffon*, *Hist. Nat.* ix. p. 316, t. 31.

This animal inhabits Sumatra, and has generally been confounded with the preceding species. It is distinguished by having

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* *Journal de Pharmacie*, for 1824, vol. x. p. 538.

† Plater *Prax.* tom. i. p. 489.

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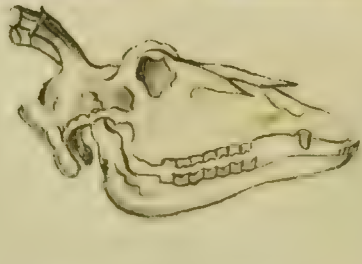

Cervus Elaphus.

London: Published by John Wilson, Princes Street, Soho, Jan.ʸ 1, 1831.

four black bands on the side of the neck, while the Civet has only three; the tail is marked with eight or nine rings; there is a white spot under the eye, and the muzzle is grey. The bag which contains the odoriferous substance is in most respects similar to that of the Civet.

VIVERRA RASSE.—*Javanese Civet.*

SPEC. CHAR.—*Fur* yellowish grey; *neck* obscurely banded with black lines; *feet* brown.

Viverra Rasse; *Horf. Java*, vi. t. 2.

THE Rasse is found in the mountainous forests of Java, where it preys on birds and the smaller quadrupeds. The odoriferous substance; the *dedes* of the Javanese, or *Jibet* of the Malays, is collected periodically, in the same manner as that obtained from the Civet, already described. This substance, which, according to Dr. Horsfield, agrees with the civet afforded by the *V. civetta* and *Zibetta*, in colour, consistence, and odour, is a very favorite perfume among the Javanese, and is applied both to their dresses, and by means of various unguents and mixtures of flowers, to their persons.

II.

CERVUS ELAPHUS.

Stag, Hart, or Red-Deer.

Order. PECORA, *Lin.* RUMINANTIA, *Cuv.*

GEN. CHAR. *Incisors* $\frac{0}{8}$; *canines* $\frac{0}{0}$—$\frac{0}{0}$ or $\frac{1}{0}$—$\frac{1}{0}$; *molars* $\frac{6}{6}$—$\frac{6}{6}$=32 or 34. *Canines*, when they exist, com-

pressed and bent back; *head* long, terminated by a muzzle; *eyes* large; *pupils* elongated transversely; a lachrymal sinus in most; *tongue* soft; *body* slender; four inguinal mammæ; *horns* solid, deciduous, palmated, branched, or simple, in the males; females, with one exception, without horns.

SPEC. CHAR. *Rufous* brown; a pale disk on the buttocks; *horns* with three anterior antlers, round, and recurved.

Ελαφος; *Arist. Hist. Animal.* ii. c. 7. 18. Cervus; *Plinii*, lib viii. c. 32. *Gesner*, *Quadr.* 326. Cervus nobilis, (Hirsch); *Klein*, *Quadr.* 23. Red Deer; *Raii Syn. Quadr.* 84; Johnston, *Quadr.* 82. *t.* 32, 35. Cervus Elaphus; *Syst. Nat. Gmelin*, 175. *Buffon*, *Hist. Nat.* vi. 63. *t.* 19. Stag or Red Deer; *Pennant*, *Quadr.* i. 114, *Br. Zool.* i. 34. *Shaw*, *Zool.* ii. 276. *t.* 177.

Le cerf; fem. *biche*; Fr.; *Cervo*; fem. *cerva*, It.; *El ciervo*; fem. *la cierva*, Sp.; *Der Hirsch*, fem. *die Hirschkuh*, Ger.; *Olen*, fem. *Lan.* Rus.; *Bugu*, Tart.

THE Stag varies, both in size and colour, in different countries; but its mean height is about three feet six inches at the shoulder, and its usual colour reddish-brown above, and whitish beneath, whence the name Red-Deer. In the summer, the upper part of the body, flanks, and outside of the thighs, are fulvous-brown, a blackish line running along the back, marked on each side with a row of pale fulvous spots. In winter these parts are of a uniform grey-brown; at all seasons the tail is pale buff, separated from the brown by a blackish line. The head, the sides of the neck, under parts of the body and legs are grey-brown, and a broad line of brown passes down the face. All these colours become darker with age, especially in the males. Individuals also occur, of a very dark brown or nearly black, particularly in the Hartz Forest, in Germany, where they are distinguished by the name of *Brand-hirsh*, or burnt stag, from their colour. In Silesia, and in some parts of America, it is generally of very large dimensions; whereas in China, Corsica, and some other parts of the world, diminutive

varieties are said to be found, which, in bulk, scarcely exceed a dog of ordinary size. The horns seldom exceed three feet in length, and the number of branches, vary according to the age of the animal. They have no horns till they are above a year old, and those do not branch till the third year, after which the branches increase in number every year. The usual number of branches on the horns of a full grown Stag, is six or seven ; but Baron Cuvier mentions one killed, by the first King of Prussia, which had thirty-three on each horn. In most cases the males only have horns ; and after their sixth year, when they arrive at maturity, they shed them annually, in the spring. Those horns are soon reproduced in a soft tender state, extremely vascular, and covered with a velvetty skin, which gradually disappears as they increase in size ; till at length, in the course of about ten weeks, they become hard, compact, and bony. The eyes of this species are large, and the pupil is elongated transversely ; the muzzle is very broad ; the tongue is very soft, and the ears are middle sized, and pointed. The female, or *hind*, is gravid eight months, and generally brings forth one at a birth, in April or May.

The Stag is a native of every country of Europe, excepting Lapland, and inhabits almost all the northern parts of America and Asia. In many parts of Britain, where it formerly occured in profusion, its numbers have been much reduced by the progress of civilization, or it has been replaced by the fallow-deer, whose venison is of a superior flavour, and whose dispositions are more placid and tractable. The Red-Deer, however, may still be found in the moors, bordering on Cornwall and Devonshire, in the New Forest, Hampshire, in the neighbourhood of the lakes, about Ullswater, in Cumberland, in various districts in the Highlands of Scotland, and on the Kerry mountains in Ireland.

This species is justly considered the most beautiful of the deer kind. The elegance of his form, says the eloquent Buffon, the lightness of his motions, the strength of his limbs, and the branching horns with which his head is decorated, conspire to give him a high rank among quadrupeds, and to render him worthy of the admiration of mankind. He has a fine eye, an acute sense of smell, and an excellent ear. When listening, he raises his head,

erects his ears, and receives the sound from a great distance. Before entering a coppice, or other half-covered retirement, he stops to look round him on all sides, and scents the wind, to discover if any object be near that might disturb him. In general he is less affraid of men than of dogs; and he is never suspicious, or has recourse to the arts of concealment, but in proportion to the molestation which he has experienced. He eats slowly, and has a choice in his aliments; and, after his stomach is full, he lies down, and ruminates at leisure, but with more difficulty than the ox, on account of his longer neck. In winter and spring he dispenses with drink; but, during the parching heats of summer, he frequents the brooks, marshes, and fountains; and, in autumn, he searches everywhere for water with which to bathe and refresh his body. On account of his fatness, he then swims more easily than at any other time. He leaps still more nimbly than he swims; and, when pursued, can readily clear a hedge or pale six feet high. His food varies according to the season; for, in autumn, he searches for the buds of green shrubs, the flowers of broom or heath, the leaves of bramble, &c.; during the snows of winter, he feeds on the bark and moss of trees; in mild weather, he browses in the corn fields; in early spring, he goes in quest of the catkins of willows, trembling poplar, and hazel, the flowers and buds of the cornel, &c.; in summer, when he has great choice, he prefers rye to all other grain, and the black-berry bearing alder (Rhamnus *frangula*), to all other wood. He crops the yew, and swallows the viper with impunity; and, in the Hebrides, he has been observed to eat submarine plants.

The horns of animals appear in general to consist almost entirely of indurated albumen; but those of the Stag are composed principally of gelatin and phosphate of lime. It is for the sake of the gelatin which they afford by decoction in water, that they have been received into the materia medica. The horns are freed from their external coat, and the internal white part is rasped down for use. They are inodorous, insipid, flexible, of a pale yellowish white colour; and contain 27 parts of gelatin in 100 parts. The shavings of other bones are sometimes substituted in their stead, especially those of the calf, and the sheep; these, however,

may be distinguished by their greater brittleness. When burnt to whiteness in the open air, they yield the *cornu ustum*, or burnt hartshorn, of the former editions of the Dublin Pharmacopœia. During the combustion, the gelatin of the horn is decomposed, and the phosphate of lime, which is the product of the process, remains; but the powder usually sold under the name of burnt hartshorn, for polishing silver, and some other useful purposes, is prepared from the bones of various animals. When hartshorn is exposed to heat, in close vessels, a large quantity of the carbonate of ammonia is disengaged, along with the other products that are usually obtained from the destructive distillation of animal matters, an empyreumatic oil, and carburetted hydrogen; a portion of carbonaceous matter remaining along with the earthy matter of the horns. Ammonia, both in a liquid and solid state, is still obtained from bones and other animal substances; but the horns of the Stag were formerly so much used for this purpose, that it was commonly called Salt or Spirit of Hartshorn.

Medical Properties and Uses.—Hartshorn shavings boiled in a proper quantity of water, afford, when the decoction cools, a transparent colourless jelly, which, rendered grateful by orange juice, sugar, and a little wine, is used in diarrhœa and dysentery, as a demulcent and as a light nutritious article of diet for the sick. Burnt hartshorn, which was formerly introduced into medical practice as an antacid in the diarrhœa of children connected with imperfect digestion and the formation of acid in the stomach, and as a remedy in molities, ossium, and ricets, is a substance apparently altogether inert; but the finely levigated powder is sometimes employed as a dentrifice. The volatile liquor, or spirit of hortshorn, is given internally, in a dose from ten to twenty drops, diluted with water, as a powerful stimulant in hysteria, gout of the stomach, and spasms, or in languors and faintness, and sometimes as an antacid. Externally, it is applied to the nostrils in syncope and asphyxia, and mixed with oil or with soap linament as an embrocation in chronic rheumatism and cynanche tonsillaris, and to parts affected with deep-seated inflammation. The oil, which rises in the distillation of volatile liquor of hartshorn, purified by repeated distillations, forms the

rectified oil, or *oleum animale,* of the old dispensatories. It may be given to the quantity of twenty or thirty drops, and is regarded as stimulant, antispasmodic, anodyne, and sudorific. Hoffman asserts that it procures a calm sleep and gentle diaphoresis, without heating the body or being followed by languor and debility; that given in a dose from ten to twenty drops or more, on an empty stomach, six hours before the accession of an intermittent, it has, like opium, had the effect of either shortening and mitigating the paroxysm, or of wholly preventing it; that it is likewise a very valuable remedy in epilepsy, hysteria, and all convulsive affections, especially when given immediately before the usual time of the attack, and preceded by proper evacuations. It is, however, scarcely ever administered internally, in modern practice. Externally, it is occasionally applied by friction, as a stimulant in paralysis, and to relieve the pain in cramp and chronic rheumatism.

In the gall-bladder of the Stag and other ruminantia are occasionally found biliary concretions, or *bezoars,* to which many virtues have been foolishly ascribed, but which have long since been deservedly expunged from the list of the materia medica.

The flesh of the Stag is held in great estimation, and affords a delicious, nutritive, and wholesome article of food. It varies according to the age and sex of the individual: in the young or fawn state, the flesh is tender, nourishing, and gelatinous; but by no means so savoury as that of the full grown animal, known under the denomination of venison. The best season for killing it is in the month of August; for in the rutting season, September and October, the Stags become lean, and its flesh rank, tough, and disagreeable. Like that of other animals, the flesh is improved by castration. The flesh of the female is at all times inferior in flavour to that of the male.

OFF. PREP.—Cornu Ustum, L. D. Liquor Volatilis Cornu Cervini, D. Oleum Cornu Cervini Rectificatum, D.

Pl. 3.

G. Reid del. et lithog.

Ovis Aries. var: Merino.

London, Published by John Wilson, Princes Str. Soho.
Jan. 1st 1831.

III.

OVIS ARIES.

Common, or Domestic Sheep.

Order PECORA, Lin. RUMINANTIA, Cuv.

GEN. CHAR. *Incisors* $\frac{0}{8}$; *canines* $\frac{0}{0}$—$\frac{0}{0}$; *molars* $\frac{6}{6}$—$\frac{6}{6}$=32. *Horns* common to both sexes, sometimes wanting in the female, thick, angular, wrinkled transversely, pale colored, turned laterally in a spiral form; *ears* small; *legs* slender; *hair* of two kinds; *tail* more or less short; two mammæ.

SPEC. CHAR. *Horns* very strong, arched backwards. and curved downwards and towards the point; general color fawn, more or less brown.

Ovis; *Plinii*, lib. viii. c. 47. *Gesner Quadr.* 771. *Raii Syn. Quadr.* 73. *Widden* Schaaf; *Klein. Quadr.* 13. *La Brebis, Buffon, Hist. Nat.* tom. v. p. 1. Ovis Aries; *Pennant, Quadr.* i. p. 37. *Shaw, Zool.* ii. p. 385. *Brebis*, Fr.; *Pecore*, It.; *Pecora; Ganado Lanar*, Sp.; *Agnez*, Russ.; *Elg.* Arab.; *Barah*, Pers.

No particular description of the Sheep, an animal known to every one, seems to be required. The horns, common to both sexes, are sometimes wanting in the females. The body is covered with two kinds of hair; the one hard and close, the other soft and woolly. The sheep is nowhere found wild, we therefore know nothing of its habits and manners in a state of nature; for in every country in Europe these animals are all private property; even in the mountainous wilds of Asia, Africa, and America, they are still under the guidance of the shepherds and their dogs. It is a gregarious animal, and is found in almost every corner of the globe, prefering dry open plains, and moderately elevated and warm

grassy or heathy pastures. It is averse to moist ground, marshy meadows, and is said to require less water than most ruminating animals. Though naturally inoffensive and timid, it does not appear to be that inanimate creature described by Buffon, who represents it as devoid of every art of self-preservation, destitute of courage, deprived of every instinctive faculty; as, in short, the most stupid and contemptible of all quadrupeds. The female goes with young about five months, and produces one, sometimes two, rarely three at a birth. This animal exists in perfection chiefly in Europe and some of the temperate tracts of Asia. When transported into very warm climates, it looses its peculiar covering and appears coated with hair; it is likewise less prolific, and no longer retains the same flavour. Thus the African or Guinea sheep is clad in hair; they have long limbs, pendulous ears, and a kind of mane on the back. The Syrian, Egyptian, Persian, and Barbary sheep has the wool coarse, the ears pendulous, and the tail very long, broad, and remarkably fat. Another singular variety, again, termed the fat-rumped, or Tartarian sheep, is characterised by the want of tail, and the presence of two large cushions of suet on the hinder part which covers the rump. The Asiatic breeds have some of them the broad tail of the African Sheep, very long legs, pendant ears, and a very short fleece. The Astracan breed is distinguished by its fine spirally curled wool. The Circassian Sheep has the tail of such length as to trail upon the ground, and the other Asiatic varieties are distinguished by the number of their horns, which vary from four to six. The Wallachian or Cretan breed is chiefly distinguished by its large, upright, curiously twisted horns, and its long shaggy fleece. America, India, and China, also possess particular breeds, but it is in Europe that, at the present day, the most useful varieties are found. Of these, the Merino sheep of Spain, here figured, holds the first place among the European varieties. It has spiral horns, lengthened outwards, and affords wool of a quality much finer than any of the other breeds. The fleece upon the Merino sheep weighs upon an average from three to five pounds. Its colour is unlike that of any other breed; on the surface it is of a dark brown, approaching almost to black, which is produced by dust adhering to the greasy

properties of its pile, and forms a striking contrast with the rich white colour below.

The varieties of sheep spread over the island of Great Britain are so numerous that it is almost impossible to enumerate and describe them. They may be divided into the breeds which have horns and those that are without that appendage. Of the hornless kind we have the old and new Leicester, Dartmore, Hereford or Ryeland, the South-down, the Cheviot, and the Shetland sheep; and of the horned kind we have the Exmoor, Dorsetshire, and Heath or Mountain sheep.

The primitive source of the domestic sheep is supposed by some naturalists to be the *Musmon* of Pliny and Gesner, *Ovis ammon* of Linné, *Mouflon* of Buffon, *Wild Sheep* of Pennant, and *Argali* of Shaw, while others regard it as a distinct species. It chiefly inhabits the mountainous districts of Asia and Greece, and it also occurs, though somewhat modified, in the islands of Candia, Corsica, and Sardinia. Its general size is that of a small fallow-deer; its colour greyish ferruginous brown, with some white on the face and legs, and beneath the throat are two pendant hairy dewlaps. The tail is remarkably short; but the horns, in the full grown animal, are extremely large, placed on the top of the head, standing close at their base, rising first upwards then bending down, and twisting outwards as in the common ram; and the body is covered with hair instead of wool.

There is hardly any part of this animal that is not serviceable to man. Of the fleece we make our cloths; the skins, when properly prepared, are in great request by saddlers, bookbinders, glovers, and other artisans; the intestines are formed into strings for musical instruments; the flesh affords a wholesome and nutritious food, and the fat or suet is employed medicinally. Suet is freed from the cellular membrane in which it occurs by melting it by a gentle heat, and then pressing it through a linen cloth. When cold it becomes concrete, has all the properties of animal fat, and differs from lard chiefly in its consistency. Both these varieties of fat consist almost entirely of two distinct oily substances which have been termed *stearine* and *elaine*, and when converted into soap, undergo the same changes as fixed oils yield-

ing margaric and oleic acids, and the mild principle of oils called *glycerine*. By distillation it affords an acid, called by Thenard, the sebacic acid.

Medical and Dietetic Properties.—Suet is emollient; and is sometimes prescribed internally, boiled in milk, so as to form a sort of emulsion, in chronic diarrhœa and disentery, arising from the presence of acrid or irritating matters in the intestinal canal. Externally it is employed as an emollient for relaxing those parts to which it is applied; but its principal use is to give consistence to ointments and plasters. Indeed, this and hog's lard are almost the only unctuous substances now retained in the British Pharmacopæias for similar purposes, although formerly more than twenty different fats entered some lists of the materia medica. Each particular fat was then supposed to possess peculiar properties; but for this there is probably no foundation; even these retained are now less employed than before, as it has been ascertained that a proper consistence may be more certainly obtained by determined proportions of wax and oil; but as these articles are more expensive, lard and suet are often substituted for them in the composition of ointments and other pharmaceutical preparations.

Mutton affords a very nourishing and wholesome aliment, less stimulant and less nutritive than beef, and in general not so easily digested. "Tup mutton, *caro arietis*" says Dr. R. Pearson, in his Practical Synopsis of the Materia Alimentaria, "has such a strong smell and disagreeable taste, and is besides so exceedingly tough and difficultly digested, that it is never eaten but by those who cannot afford to purchase mutton of a better quality. Ewe mutton, *caro ovis femellæ*, if it be more than between two or three years old, is likewise tough and coarse. Wedder mutton, *caro vervecina*, or the flesh of the castrated animal, is more esteemed, and is by far the most palatable and digestible. Lamb, *caro agnina*, being less heating and less dense, is better suited to weak stomachs; but this applies only to the flesh of lambs that have not been robbed of their blood by repeated bleeding, or reared by the hand with milk adulterated with chalk, in order to make the meat appear white. Such practices to render the food pleasing to the eye, at the expence of its alimentary properties, cannot be too

Castor fiber.

much reprobated. Ewe's milk, *lac ovillum*, is thick and heavy; it abounds in cream, and contains but a small proportion of whey, and is scarcely ever used either in the way of diet or medicine. Mutton broth, *jus vervecinum*, is often taken, but not very properly, by delicate and weak persons. It is strong, and does not sit very well upon the stomach. Broth made of sheep's trotters, *decoctum pedæ vervecinorum*, is administered in the form of enema in abrations and ulcerations of the intestinal canal, and in other cases in which nourishment cannot be given by the mouth."

OFF. PREP.—Sevum præparatum, L.

IV.

CASTOR FIBER,

Common Beaver.

Order GLIRES, *Lin.* RODENTIA, *Cuv.*

GEN. CHAR.—*Incisors* $\frac{2}{2}$; *canines* $\frac{0}{0}$—$\frac{0}{0}$; *molars* $\frac{4}{4}$—$\frac{4}{4}$=20. *Molars* with flat crowns, and transverse or sinuous and complicated ridges of enamel; *toes* five on each foot, the anterior short and close, the posterior longer and palmated; *tail* broad, thick, flattened horizontally, of an oval form, naked, and covered with scales.

SPEC. CHAR.—*Fur* consisting of two sorts of hair, one coarse and brownish, the other downy, more or less grey; *tail* flat, oval, and naked; *length* about two feet.

Καστωρ; *Arist. Hist.* lib. viii. c. 5. *Diosc.* ii. 26. *Oppian*, i. 398. Fiber; *Plinii*, lib. viii. c. 30. *Agricola*, *An. Subs.* 482. *Belon*, *Aquat.* 25. Castor; *Gesner*, *Quadr.* 309. Castor sive Fiber; *Raii*, *Syn. Quadr.* 209. Castor Fiber; *Syst. Nat. Gmelin*, 124. *Klein*, *Quadr.* 91. *Shaw Zool.* ii. 30. t. 128. Le Castor, ou le Bievre; *Buffon*, *Hist. Nat.* viii. 282. t. 36. Beaver; *Pennant*, *Quadr.* ii. 114. *Br. Zool.* i. t. 9.

Bievre; Castor, Fr.; *Bivaro; Castoro*, It.; *Bibaro; Castor*, Sp.; *Der Bieber; Kastor*, Ger.; *Bever*, Dut.; *Bæver*, Dan.

In respect of external physiognomy and habit, this animal may be compared to the badger; but it is rather larger, and uniformly of a reddish brown colour. The usual length of the Beaver is about two feet ten inches, exclusive of the tail, which is oval, nearly a foot in length, covered with hexagonal scales, and compressed horizontally, but somewhat convex on its upper surface; it is destitute of hair, except at the base, and can be moved vertically and laterally with considerable force, but the creature usually drags it after him. The hair of the Beaver is fine, smooth, glossy, and most commonly of a chesnut colour, with a shorter downy grey fur beneath, varying sometimes to black. The colour, however, of the Beaver is subject to considerable variations; thus M. Geoffroy remarks that the Beaver of France is generally of an olivaceous yellow; and white, black spotted with white, and cream-coloured varieties, have also been noticed. The feet are five-toed; those behind being furnished with webs, and adapted to swimming; but the animal in walking places on the ground only the toes of the fore-feet, while it rests the entire sole of the hinder. The eyes are small, with a round pupil, and the ears short and hairy. According to M. F. Cuvier, the conch of the ear is simple, and closes when the animal dives; so do the nostrils. In the same pouch with the organs of generation and anus, are situated two pair of glands, of an oblong shape; the two upper are filled with a fatty substance, whilst the two others contain each about two ounces of an oily viscid matter, inclosed in membranous cells, which is the officinal castor. The antients entertained an opinion that the drug called castor was lodged in the testicles of the male, and that the animal, when hard pressed by the hunters, would bite them off, and leave them to his pursuers:

> Eunuchum ipse facit, cupiens evadere damno
> Testiculorum: adeo medicatum intelligit inguen.
>
> *Juvenal*, sat. xii. v. 34.

Beavers are found in most of the northern parts of Europe, Asia, and America, abounding most in cold regions, and becoming less common towards the south. At present, they are met with in the greatest numbers in North America, especially in Canada,

where the hunting of these animals, and collecting their furs, forms a very important object of commercial traffic. In antient times the beaver was a more general inhabitant of Europe than it is at present, particularly in the vicinity of some of the larger rivers, as the Rhine, the Rhone, and the Danube, where they are now comparatively scarce, and in Britain they have been wholly extirpated for many centuries. That the Beaver was once indigenous to different parts of Britain, particularly Wales and Scotland, is certain, upon the credit of the most authentic records; and the fact of its having been one of the native quadrupeds of Scotland, has received the most ample confirmation from the occurrence of the fossil remains of the animal in Perthshire and Berwickshire.* The earliest written authority we have of the existence, in former times, of the Beaver in Wales, is contained in a remarkable document of the ninth century,—the Laws of Howel the Good,† where the price of the Beaver's skin is estimated at no less than 120 pence. The latest account of this subject is contained in the "Itinerarium" of Sylvester Giraldus,‡ who travelled through Wales in 1188, or about 300 years after the date of Howel Dha. He gives a brief history of their manners; and adds that, in his time, the Beaver, distinguished by the descriptive and appropriate title of *Llosdlydan*, or "broad tail," was only found on the confines of the river Teivi, in Cardiganshire. In their natural state, they subsist entirely on vegetable food, such as roots, young wood, and the bark of trees; they are very partial to the roots of the Magnolia *glauca*, which in America is known by the names of white laurel, swamp sassafrass, and Beaver tree; the poplar, aspin, and birch, are the favourite food of the European beavers. During summer, when these are to be obtained in great abundance, the beavers pass that season in wandering about the meadows and thickets that border the lakes and rivers which abound in North America. On the approach of winter, they quit their roaming

* See an interesting paper on the Beavers of Scotland, by Mr. Patrick Neill, in the *Edinburgh Philosophical Journal*, vol. i. p. 177.

† *Leges Wallicæ*, by Dr. Wotton, book iii. § 11, 12.

‡ *Itinerarium Cambriæ*, lib. ii. cap. 3.

way of life, form themselves into companies, and, instructed by instinct, begin to provide for the wants of the season, and set about constructing those habitations which have so long excited the wonder and admiration of mankind.*

Beavers are hunted in the winter season, both for their fur, and for the castor, which is not peculiar to the male, as once supposed, but is found in both sexes. When the animal is taken, the follicles are cut off entire, and dried either by exposure to the sun, or in smoke. The castor is at first of the consistence of syrup, but soon becomes solid, viscid, and even dry and friable. That which comes from Russia is the most valuable, and sells at a much higher price than what is imported from America. The membranous pouches of the Russian castor are larger than those of Canada, dry, of a roundish or pyramidal form, very heavy, and appearing when cut of a deep liver colour. The pouch which constitutes the Canadian castor is about the size of an hen's egg, or rather larger, dry, thin, of a reddish-brown colour, and covered externally with a very tough corrugated membrane. The goodness of the castor is determined by its sensible qualities; when it has been long kept it becomes black, insipid, inodorous, or very soft, and is rendered unfit for medicinal purposes. It is said to be sometimes counterfeited in this country, by a mixture of galbanum, ammoniacum, and other resinous substances, with a little real castor, artificially interspersed with membranes, and stuffed into the scrotum of a goat. "Quiconque," says M. Fee, "a vendu castoreum ne peut se laisser abuser par cette fraude grossière.†

Castor has a strong, pungent, disagreable smell, and a sub-acrid, bitterish, nauseous taste. It is usually dry, solid, of a reddish-brown colour externally, feels unctuous, and is mixed internally with whitish membranes. The active matter of castor is dissolved by ether, alcohol, proof spirit, and partially by water. According

* For a more detailed account of the natural history and habits of the Beaver, the reader may consult Buffon's *Natural History of Quadrupeds*, Du Pratz's *History of Louisiana*. Cartwright's *Journal of Transactions, &c. on the Coast of Labrador*, and Hearne's *Journey to the Northern Ocean*.

† *Cours d'Histoire Naturelle Pharmaceutique*, i. p. 96.

to MM. Bouillon la Grange and Laugier, it consists of a mucilage, a bitter extract, a resin, an essential oil, in which its peculiar smell appears to reside, and a flaky crystalline matter, much resembling the adipocere of biliary calculi.* M. Bizio discovered a new principle in castor, to which he has given the name of *castorine.*†

Medical Properties and Uses.—Castor has generally been regarded as a powerful antispasmodic and emmenagogue, and has been found useful in most cases requiring such remedies, when given in doses from ten to thirty grains. It has been styled also, without sufficient foundation, an aphrodisiac, and has been supposed to possess a sedative power; but Dr. Cullen says, he had never perceived this, excepting where such effects might be imputed to its removing the spasmodic affections which interrupted sleep. Sydenham used to prescribe it, in small quantities, joined with *sal succini,* in hysteria; and Whytt and others in the same cases, combined with opium. Pliny informs us that, in his days, the best castor was brought to Rome from Galatia and Africa, and that it was considered as a useful medicine in soothing and procuring sleep, and in tetanus.‡ Celsus prescribed castor combined with pepper in cases of tetanus. At the present day it is employed in all spasmodic diseases, in epilepsy, hooping cough, asthma, hysteria, in suppressed menstruation, in flatulent colic, and in typhus. By Stahl, and some other celebrated practitioners, the virtues of castor have been doubted. Experience, however, has shewn that its medicinal powers are considerable, though less important than they have generally been supposed. The American savages are said to obtain an oil from the tail of the beaver, which they apply as a topical remedy for different complaints. The flesh is seldom eaten, though fat and delicate to appearance, it is extremely bitter and unpalatable.

Off. Prep.—Tinctura Castorei.—L. E. D.

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* *Dict. Scienc. Nat.* vii. 466.

† *Giorno de Fisica,* vii. 174.

‡ *Hist. Nat.* lib. xxxii. cap. 3, p. 394.

V.

ORNITHORYNCHUS PARADOXUS.

Common Ornithorynchus.

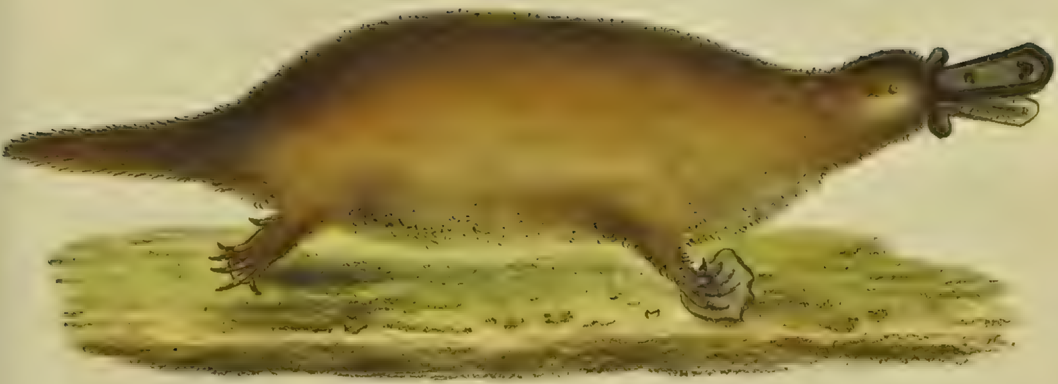
Order PALMATA, *Blum.* EDENTATA, *Cuv.* Tribe MONOTREMA, *Geoff.*

GEN. CHAR.—*Incisors* $\frac{0}{0}$; *canines* $\frac{0}{0}$—$\frac{0}{0}$; *molars* $\frac{2}{2}$—$\frac{2}{2}$= 8. *Molars* fibrous, fixed only in the gum; *body* covered with hairs, anteriorly terminated by a broad, depressed duck-like beak; *legs* four, pentadactyle, palmated, with a spur on the hind ones in the male; *anterior legs* with the palmated membrane projecting beyond the claws, which are straight; *hinder legs* with acute curved claws, produced beyond the palmate membrane.

SPEC. CHAR. *Beak* and *legs* black; *anterior claws* linear, obtuse; *fur* reddish-brown above, paler below; extreme *length* 23 inches.

Ornithorynchus fuscus; *Peron et Lesseur, Voy. Teras Austr. Atlas*, t. 34. *Leach. Zool. Miscel.* ii. t. 111. Ornithorynchus Paradoxus; var. *rufus; Blumenbach, Handbuch der Naturgeschichte*, p. 128; Id. *Abbild. Nat. Hist. Gengenst*, t. 41.

THIS extraordinary animal, which unites the bill of a duck with the limbs of a quadruped, has lately been discovered to be poisonous, by means of a spur, which is attached to the hinder legs of the male, and is capable of inflicting very dangerous, if not fatal, wounds. The body is covered with a very thick soft fur, and is of a dark brown colour above, and somewhat paler or ferruginous beneath. The hair is of two sorts; that which is found on most parts of the body, particularly on the sides and abdomen, is fine and silky, while the hair covering the tail is stronger, resem-



Ornithorynchus paradoxus.

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bling bristles, and more distinctly clavate at its extremity. The head is flattish and rather small; but what distinguishes the Ornithorynchus from all other quadrupeds is the anomalous form of its jaws, which resemble the broad flat bill of a duck, and are covered in the same way with a soft membrane, plentifully supplied with nerves for the purpose of tasting, and also like it, serrated at their lateral edges; round the base is a broad, flat, irregular membrane or flap, somewhat deeper or wider below than above. The length of the upper mandible, including the flap, is about three inches; that of the lower bill and flap, only two. The nostrils are small, elliptical, and situated about a quarter of an inch from the tip of the bill, and are about the eighth of an inch distant from each other. The teeth are placed towards the lower part of the mouth, and consist of simple cartilaginous fibres, flat at the crown, not planted in alveoli, but simply attached to the gum; the tongue is short, and furnished with papillæ, and two aculeated horny points. The length of the whole animal from the tip of the bill to the extremity of the tail is nearly two feet. The tail is broad, flat, tapering, obtuse, about six inches in length, and is colored similar to that of the body. The eyes are situated in the upper and anterior part of the head, close to the flap; the eye-balls are small, and placed deep in the orbits. There is no external ear, but the auditory foramina are placed immediately behind the eyes, and are covered with short hairs. The legs are very short, terminated by a broad web, which in the fore feet extends beyond the claws, and can by that means be folded up like a fan. Both feet are furnished with five strong horny claws; on the hinder ones longer, curved, acute, and projecting beyond the palmate membrane. The organs of generation are not visible externally, and in common with the rest of the tribe the animal has but one opening.

"On the heel of the hinder feet," says Dr. Knox, "there appears externally a *spur*, much resembling that found in the common dunghill cock. It is strong, semitransparent, and pointed; and there is evidently an aperture at the point, or rather on its convex surface, and sloped as if a small piece had been cut out of it, without shortening the spur. Through this a delicate

black body, like a bristle projects ; it seems of a horny consistence ; though a strong magnifying glass was used, it did not appear to be hollow. On removing the integuments carefully, the spur is found to rest by its base on a flat bone, placed longitudinally over the tarsal bones, and situated between the lower extremity of the tibia (to which it is attached) and the tarsal bone corresponding to the inner toe. Its principal connection, however, is at the astragalus. In this way two joints are formed ; viz. one between the bone on which the spur rests and the other bones of the tarsus, and the other between the spur itself and the bone. The motion in both these joints is inwards towards the tail, and this is the direction which the spur assumes, and the only one in which it can possibly wound. If a longitudinal section be made of the spur, it will be found to contain a comparatively large membranous canal, gradually increasing as we proceed towards the base ; this membranous canal is contained in the centre of the spur, which, immediately around it, has a whiter appearance than the more external portions, but has no resemblance to bone, as some estimable authors have stated.

" As the membranous duct approaches the base of the spur, it becomes very strong, as if semi-cartalaginous tunics were superadded to it ; just as it quits the spur to enter the sole of the foot, the duct makes a sudden turn, and is much contracted ; it next expands a little, and at this point its parieties show so as to give it the appearance of a bulb or gland, an appearance which together with the deep situation of the sac in the hollow of the foot, led M. de. Blainville to consider it as the poison-gland itself, and which evidently has been the cause of the singular errors relative to the anatomy of the spur. When this bulb is laid open, it is found to be merely a continuation of the mucous canal, which has at this point become greatly strengthened in its parieties, and assumed an almost muscular appearance. In the hollow of the foot the duct opens by a sudden turn into a comparatively large sac, surrounded and inclosed by strong ligaments, and tendinous parts, connected with the small bones of the foot. From this sac or bag, which in either foot contained a good deal of a brownish mucous matter, arises the great duct leading to the poison-gland.

"We may now trace this duct either from the sac towards the gland, or *vice versa*. If the first plan be adopted, we perceive that the duct enters the central sac by a small round orifice, and next makes a very sudden turn to reach the superficial part of the foot, and is soon found almost immediately under the integuments. From this point it proceeds towards the gland, gradually decreasing in strength of parieties, but increasing in diameter until it terminates, or rather commences, in the poison-gland itself, situated over and somewhat above the hip joints and loins. Throughout its course the duct lies imbeded in loose cellular membranes, and beneath the caudo-tibial muscle, which must be removed, in order to have a perfect view of the duct. Is is rather difficult to state the precise length of the duct from its origin in the poison-gland to its passage into the small sac, situated in the hollow of the foot; for about eight-tenths of an inch its parieties are comparatively thin, and its diameter sufficient to admit a common blow pipe. The remainder of the duct, and the sudden turn it makes to pass down into the centre of the foot and to reach the sac, have been already described.

"The poison-gland itself is about an inch in length, and six-tenths of an inch in breadth. It is a conglomerate gland, that is, made up of small ones, imbeded in a tissue of different appearance, and which is probably cellular. It lies longitudinally with respect to the spine, immediately above the hip-joint, and close to the os innominatum of the corresponding side. It advances but little towards the loins; it covers many of the muscles which rotate the thigh, and may readily be found by merely removing the integuments, panniculus carnosus, and a small quantity of loose cellular membrane lying over the os innominatum and hip-joint.

"The functions of these parts may now be very readily understood. The poisonous fluid secreted by the gland, is conveyed by the long duct into the sac, situated deep in the hollow of the foot, close to the heel. From this it is projected into the membranous canal contained in the centre of the spur, and which, by an almost inexpressible error, has hitherto been mistaken for a bone. Along this it will easily flow into the wound inflicted by the spur, passing

through the small perforations, existing as well in the termination of the membranous canal, as in the spur itself."*

As there are no visible mammæ, and as these organs have not hitherto been observed, the Ornithorynchus is generally presumed to be oviparous. This opinion, however, has been satisfactorily proved to be erroneous, by the dissection of the animal lately made by Professor Meckel.† He has demonstrated the existence of mammary glands; hence it may be inferred that this animal is viviparous, or brings forth live young. Two species, or varieties, are noticed, one with pale, reddish, and smooth fur, the other characterized by dark-brown fur, flattened and crisped.—Fig. 1 exhibits the mammary glands; 2. the large poison-gland and duct leading from it to the base of the foot, the membranous canal, and the spur; 3. the same detached; 4. a section of the spur; 5. under side of the hind foot, exhibiting the spur.

The Ornithorynchus inhabits the rivers and marshes, in the vicinity of Port Jackson, especially the river Nepean, on the eastern coast of New Holland. It is called by the colonists, the *water-mole*, and is supposed to subsist chiefly on worms and aquatic insects.

The poison when injected into the wound inflicted by the animal, causes violent pain, inflammation, and swelling, but the consequences are not generally fatal. In one case, related in a paper read before the Linnean Society of London, by Sir John Jamieson, who resided some time in New Holland, the arm swelled, the jaw became locked, and the patient exhibited all the symptoms of persons bitten by poisonous snakes. They yielded to the external application of oil, and the internal use of ammonia, but the man suffered acute pain, and did not recover the use of his arm in a month. On examining the spur it was found to be hollow, and on pressing it a quantity of venom was squirted out. For what purpose the animal is supplied with this poison does not appear, though probably it is for the means of defence.

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* *Memoirs of the Wernerian Natural History Society*, v. 5, p. 26.

† *Ornithorynchi Paradoxi Descriptio Anatomica*, fol. Leipsic, 1826.

Sus scrofa.

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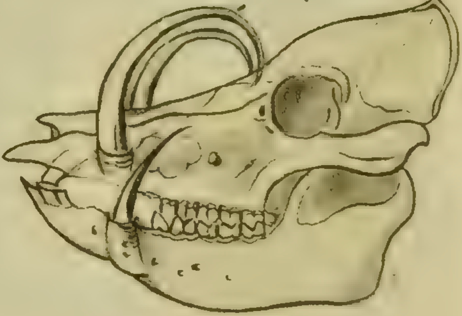


London Published by John Wilson, Frances Street, Soho, Feb.y 1st 1831.

VI.

SUS SCROFA.

The Wild Hog.

Order. BELLUÆ, *Lin.* PACHYDERMATA, *Cuv.*

GEN. CHAR. *Incisors* $\frac{4}{6}$ or $\frac{6}{6}$; *canines* $\frac{1}{1}$—$\frac{1}{1}$; *molars* $\frac{7}{7}$—$\frac{7}{7}$ =42 or 44. *Canines* very long and bent upwards ; *molars* with tuberculated crowns ; *toes* four, fenced with hoofs, on each foot, and of which only the two intermediate ones touch the ground ; *snout* truncated, elongated, cartalaginous ; *body* covered with bristles : *teats* twelve.

SPEC. CHAR. *Body* bristled in front ; *canines* strong, triangular, directed internally ; no protuberance under the eyes ; *colour* blackish grey in the wild animal, but varying much in the domesticated races.

Ὑs ἀγριος ; *Arist. Hist. Anim.* 1. c. 2. Καπρος ; *Id.* ii. c. 9. 11. v. c. 13. *Oppian Cyneg.* iii. 304. Συs ἀγριος ; *Ælian An.* v. c. 45. Sus ferus, Aper ; *Plinii, Hist.* lib. viii. c. 51. Sus agrestis, sive Aper, Wild Boar, or Swine ; *Raii Quadr.* 96. Wild Schwein ; *Klein, Quadr.* 25. Aper ; *Gesner Quadr.* 1039. Sus caudatus ; *Brisson, Quadr.* 75. Hog ; *Pennant, Brit. Zool.* i. 41. Id. *Hist. Quadr.* i. 140. Le Sanglier ; *Buffon, Hist. Nat.* v. p. 176, t. 14. Sus scrofa ; *Lin. Syst. Nat. Gmelin.* i. 217. *Shaw. Zool.* ii. t. 221.

THIS is the origin of all the varieties of this useful quadruped. It is a native of almost all the temperate parts of Europe and Asia, and is also found in the north of Africa, but is not met with in the arctic latitudes. From the concurrent testimony of many respectable writers, it appears that the Hog was formerly indigenous to this country; thus it is asserted by Fitz-Stephens, that the vast forests which, in his time, grew on the north side of London, was the retreat of stags, wild boars, and bulls.

The Wild Hog chiefly affects the hilly and wooded districts,

subsisting on roots, acorns, beech-mast, and various vegetable substances, and will not refuse animal food when it comes in its way, though it is not properly carnivorous. It varies much in size, but is generally considerably smaller than the domestic hog. Its colour, when full grown, is of a blackish grey, tinged with various shades of yellowish brown, and sometimes quite black. In the young state it is marked by alternate dusky and pale stripes, disposed longitudinally on each side of the body. Beneath the bristles there is a finer, and somewhat woolly hair. The chin, legs, and tail are black; the ears are short, rounded, erect, black; and the snout is rather longer, in proportion, than that of the domestic breed. The principal difference, however, is said to consist in the superior size and length of the tusks, which are often several inches long, and capable of inflicting the most severe and fatal wounds. The sketch here given was made from an individual in the gardens of the Zoological Society, in the Regent's Park, which was presented to the society by his late Majesty, King George the Fourth.—Fig. 1. represents the skull of the common Hog. 2. The skull of the Babiroussa, or Indian Hog.

In consequence of domestication, the Hog varies very much in colour, size, and shape. One of the most remarkable varieties is characterized by solid or undivided hoofs, and is said to be common in Sweden, especially in the neighbourhood of Upsal. The large-eared variety is very common in France, Germany, and England. The Polish and Russian Hogs are of a reddish colour, and seldom attain to any considerable bulk; whereas the English breed frequently acquires an extraordinary size, and sometimes weighs 1200 lbs. The Chinese and Siamese breed, which is smaller than the common sort, with short legs, and the belly very large and pendulous, excels in the whiteness and delicacy of its flesh.

The lard or fat, which is the officinal part of the Hog, is obtained chiefly from the flank of the animal. For medicinal purposes it is freed from the vessels and membranes by washing it in water, and afterwards melting it, with the addition of a little water to prevent the heat from rising too high. When cold it becomes concrete; is inodorous, tasteless, and white. It is insoluble in

water, alcohol, and ether, but is decomposed by strong acids, the nitric acid converting it into acetic and oxalic acids, according to Gren, when distilled repeatedly from it. The alkalies form soaps with it, and it combines with some of the earths and metallic oxides, forming a series of saponaceous compounds. From the experiments of M. Chevreul, it appears to consist of two proximate principles, which can easily be separated from each other. These principles have been named by him *elain* and *stearin*, the former existing in the liquid state, and forming an oily looking fluid at the common temperature, while the other exists in a solid state under the same circumstance. The ultimate elements of fat, are carbon, oxygen, and hydrogen.

Medical and Dietetic Properties.—Lard is sometimes used in frictions as an emollient, and forms the basis of various ointments. It is compounded by the perfumer into pomatums, and tinged with a little turmeric and scented, it forms the "genuine bear's grease," so much extolled for promoting the growth of hair! The flesh of the castrated animal, or pork, is highly nutritious, but on account of the fat, with which it abounds, it is not very easily digested. It is stimulant and savory, and affords a strong aliment, suited to persons who lead an active and laborious life. Pork, either boiled or roasted, was the favourite food among the ancient athletæ; and was found of so nutritious a quality, according to Galen, that those who intermitted the use of it but for one day, were sensible the next of a material diminution of their vigour. "The too frequent and long continued use of this meat," says Dr. R. Pearson, "favours obesety, produces foulness of the stomach and bowels, and occasions disorders of the skin." This is said to be the case with the inhabitants of Lima, who are much addicted to the use of pork. The quality of pork, and swine's flesh, varies remarkably according to the kind of food on which the animal feeds. Thus, in Corsica, where the hogs feed on chesnuts, and in Persia, where they are often fed upon dates, their flesh is peculiarly good. This is also the case in some of the tropical latitudes, where the hogs are fattened with the sugar-cane. The flesh of the sucking-pig, *caro porcelli lactentis*, is reckoned a great delicacy; it is very nourishing; but by reason of the quantity of fat and gelatine, it is

not very readily dissolved in the stomach, and is therefore by no means a proper food for weak and sickly persons. Bacon, *caro suilla vel porcina salita et infumata,* is a coarse and heavy food, only fit to be taken in considerable quantity by robust and labouring people. When it constitutes a principal part of the daily diet, it brings on the scurvy and other cachectic disorders.

Off. Prep.—Adeps preparata, L. D.

VII.

PHYSETER MACROCEPHALUS.

Great-headed Cachalot, or Great Spermaceti Whale.

Order Cete, *Lin.* Cetacea, *Cuv.*

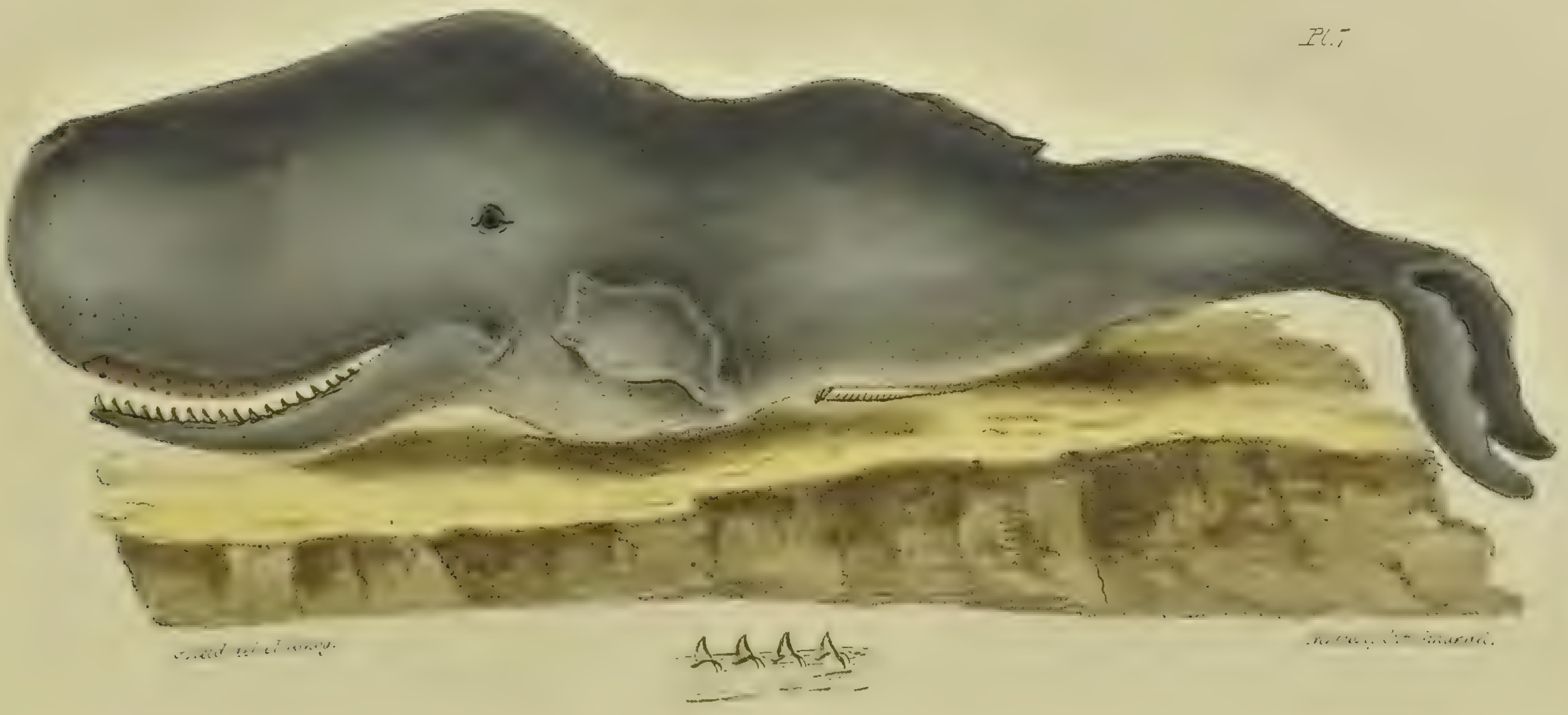
Gen. Char. *Head* very large; *inferior teeth* 18 to 23 on each side of the jaw; *upper jaw* broad, elevated, without teeth, or with these short and concealed in the gum; *lower jaw* elongated, narrow, corresponding to a furrow in the upper, and armed with thick and conical teeth entering into corresponding cavities in the upper jaw; *spiracular orifices* united at the upper part of the snout; *a dorsal fin* in some species, *a simple eminence* in others; *cartalaginous cavities* in the upper part of the head, filled with an oily matter.

Spec. Char. *Lower teeth* 20 to 23 on each side, recurved and pointed at the extremity; *small conical teeth* concealed in the upper gums; *tail* narrow and conical; *back* convex, with the rudiments of a fin; *upper part of the body* blackish or slate blue; *length* 45 to 60 feet.

Grand Cachalot; *Bonnat. Ency. Meth.* art. *Cetologie*, t. 6. f. 1 and t. 7. f. 2. Cachalot macrocephale; *La Cepede*, p. 166. Physeter macrocephalus; *Lin. Syst. Gmelin.* i. 227. *Shaw Zool.* ii. t. 228.

Cachalot, Fr.; Potfisch, *Cas-chelott*, Ger.; *Kaskelot*, Nor.

Pl. 7



Physeter macrocephalus.

The Chacolots or Spermaceti Whales are furnished with teeth only in the lower jaw, and are remarkable for the size of their head, which in some species is equal to the half, and in others to the third, of the whole animal. They belong to the last order of the class Mammalia, in most of the modern systems of Zoology, especially in those of Linneus, Blumenbach, and Cuvier; while, in the writings of the older naturalists, they have been regarded as an order of fishes. They differ from fishes in the structure of their *atlantal* extremities, by their mode of breathing, and by their producing young alive and suckling them by means of teats. Eight species of this tribe have been distinguished, all of which afford the fatty substance improperly called *spermaceti*, which is contained in cartilaginous cavities in the bones of the head, where it is held in solution by an oil, which is generally expressed. The Physeter *macrocephalus* is a very large animal, growing to the length of nearly sixty feet, and measuring thirty feet in circumference at the thickest part of the head. The head is of prodigious size, and may be said to exceed the rest of the body in magnitude. It has been compared to an immense box, rounded and obtuse at one end, and rising into a slight convexity at the neck. The back is more or less convex, and near its middle there are the rudiments of a fin, which is short, directed backwards, and truncated at the end. The upper part of the body is of blackish or slate-blue colour, sometimes spotted with white, and the belly is greyish or white. The mouth is wide; the upper jaw much broader than the under, which is long and narrow, fitting as it were into a longitudinal fissure or groove in the upper. The lower jaw is furnished on each side with a row of conical teeth, recurved and pointed at the extremity. On each side of the upper jaw, is a row of holes for receiving the teeth of the lower jaw, and the intervals between these cavities are filled up with the rudiments of teeth, just appearing a little beyond the gum. The eyes are small, furnished with eyelids, and situated at a great distance from the snout. The external orifices of the auditory passages are scarcely perceptible. The tongue is of a square form, and of a livid red colour, and below the snout is the principal cavity that contains the spermaceti. The spiracle, or blow-hole, which appears externally simple, is double within; it is about six

inches in diameter, and placed just about the end of the snout. Both the pectoral fins and tail are comparatively small, and the lobes of the latter are long and pointed, and have a waving margin. The genital organs are enveloped in a sheath, and the penis of the male is sometimes eight feet in length.

The great Spermaceti Whale swims swiftly, and pursues with great eagerness the Squalus *Carcharias*, or white shark. It also feeds on the lump-fish, dog-fish, the Sepia *octopodia*, and other marine productions. It is found most commonly in the Greenland seas, and about Davis's Straits, in North America; but has occasionally been seen in the German Ocean, and the British Channel. A considerable number of them were cast on shore on the coast of Lower Brittany, in France, in the year 1784.

This species yields a considerable quantity of spermaceti, for which chiefly it is taken, though its flesh, skin, tongue, and intestines are eaten by the Greenlanders. The flesh is of a pale red, like that of pork, and the tongue is esteemed a great delicacy when roasted, The blubber is about five or six inches thick on the back; but the animal is not very productive of oil.

The *spermaceti*, or *cetine*, as it is called by Chevreul, is contained in numerous cartalaginous cavities in the upper part of the head. When fresh, and in its natural receptacle, it is semi-fluid, and has a yellowish unctuous appearance, but concretes when exposed to the air in opaque masses. The oil, containing the spermaceti in a state of solution, is taken out of the cavities containing it and brought home in barrels, for various domestic and medicinal purposes. In this country, however, spermaceti undergoes a particular process for its purification. The mass is put into hair bags, and pressed between plates of iron, in a screw press, until it becomes hard and brittle. It is then broken to pieces and thrown into boiling water, where it melts, and the impurities rising to the surface are skimmed off. After being cooled, and separated from the water, it is put into fresh water in a large boiler, and a weak ley of the potash of commerce added to it by degrees. This part of the process is thrice repeated, after which the whole is poured into coolers, where the spermaceti concretes into a semi-transparent mass. Thus obtained it is a beautiful white, somewhat

brittle, unctuous substance, usually in small scales, has scarcely any taste, and but little smell. Its specific gravity is 9.433. It melts at 112°, burns with a clear flame when exposed to a higher temperature, and is volatalized by heat, being at the same time partially decomposed. It dissolves readily in hot alcohol, ether, and oil of turpentine, but separates as the fluid cools. It is completely soluble in the fixed oils. It is insoluble in water, but can be diffused in that fluid by means of the yolk of egg or mucilage. It combines with the alkalies, forming soaps, which are not quite so perfect as those prepared with the common fat. The weaker acids do not act on it, but the strong sulphuric acid dissolves it, forming a dark coloured, thick, soapy solution. When a mineral acid is added to the soap which it forms with potass, a peculiar fatty substance is precipitated, which is called *cetic acid* by M. Chevreul. It was formerly supposed to be the basis of the common biliary calculi, but Chevreul shewed that it differs essentially from this substance, which he has called *chloresterine.*

The highly esteemed odoriferous substance, so well known by the name of *ambergris,* has been discovered in the intestines of the Spermaceti Whale. It has been observed, that the Whales that contain ambergris are always lean and sickly, yield but very little oil, and seem almost torpid; but it is uncertain whether it is the cause or effect of disease. Ambergris occurs in irregular shaped masses, of various sizes, which have a compact texture, and an ash-grey colour, marked with yellowish, brown, and white streaks. Its specific gravity varies from 0.849 to 0.844. It is generally brittle, feels unctuous, and if good adheres like wax to the edge of a knife with which it is scraped. It has an agreeable smell, which improves by keeping. Its taste is insipid; it melts when heated at 144°; and at 212° is volatalized in the form of white vapour. According to the analysis of Bouillon la Grange, 100 parts of ambergris contain 52.7 adipocere, 30.8 resin, 11.1 benzoic acid, and 5.4 charcoal. From more recent experiments it appears to consist principally of a peculiar matter, which is called *ambrein,* by Pelletier and Caventou; this substance bears a great resemblance to chloresterine, and is obtained by digesting the ambergris in alcohol, which deposits chrystals of ambrein as it cools.

Medical Properties and Uses.—Spermaceti is used internally as a demulcent in catarrh, phthisis pulmonalis, diarrhœa and dysentery; and externally in ointments to wounds and excoriations of the skin. As an internal remedy it possesses no advantages over the fixed oils, which as Dr. Pearson justly observes are more readily united with water through the medium of alkalies and mucilages, and are less liable to become rancid and nauseating by keeping. Spermaceti is sometimes prescribed in the form of an emulsion, diffused in water by means of the yolk of an egg, as a vehicle for the tincture of opium to women in child-bed, when the after-pains prove troublesome. It is principally employed in the composition of ointments and cerates, which are applied as a dressing to inflamed parts, and prove useful in a great measure by excluding the air. Spermaceti readily dissolves caoutchouç, and this property renders it useful as a lute, for stopping vessels in certain chemical operations. M. Fee says, in France, it is used in the manufacture of bougies of great beauty, the more so, as by a process little known, they are made transparent. It is given in a *dose* of from ʒss. to ʒiss. rubbed with sugar, or with an egg in emulsiou.

Ambergris has occasionally been employed in medicine, but as it seems to possess very little efficacy, it is now very generally disused in most parts of Europe. Dr. Swediaur took thirty grains of it without perceiving any sensible effect. In Turkey, Persia, and the East, it is used as an aphrodisiac, though its virtues in this respect are perfectly imaginary. In this country, ambergris is principally used in perfumery. A few drops of the alcoholic solution, or essence as it is commonly called, mixed in minute quantity with lavender water, tooth-powder, hair-powder, wash-balls, &c. adds much to the fragrance of their scent.

Off. Prep.—Ceratum simplex, E. Ceratum Cetacei, L. Unguentum Cetacei, L. D.

PHYSETER TRUMPO.—*Blunt-headed Cachalot.*

Spec. Char.—*Body* irregularly conical, with a protuberance on the back; no *dorsal fin.* *Teeth* straight, pointed.

Physeter Macrocephalus; Var. F. *Lin.* Blunt-headed Cachalot; *Pennant, Brit. Zool.* iii. p. 61. Cachalot Trumpo; *La Cépede,* p. 212. t. 10. f. 2. *Bonnat. Ency. Meth.* t. 8. f. 1.

THE length of this species is about sixty feet, and its breadth about fifteen. The head is of enormous size; the upper jaw is much longer than the lower, round and obtuse at the snout, and about eight feet deep, from crown to base. The lower jaw is about ten feet long, very narrow, and having about eighteen teeth on each side, all pointed outwards. The eye is small, and placed many feet behind the snout, nearly in the middle of the breadth of the upper jaw. The body is irregularly conical, with a prominence on the back, and another on the belly just before the anus. The swimming paws are proportionally larger than in the former species; and the prevailing colour of the animal is of a blackish grey.

This species yields a great quantity of spermaceti, and its blubber is very productive of oil, of a finer quality than that of the common Whale. It is found in the Greenland seas, and in those that wash the shores of New England, and is occasionally seen on the coasts of France and Britain.

PHYSETER MICROPS.—*Small-eyed Cachalot.*

SPEC. CHAR. *Dorsal fin* long, erect, and pointed; *teeth* conical, pointed, and curved inwards.

Great-headed Cachalot; *Pennant, Brit. Zool.* iii. Cachalot Microps; *Bonnatere, Ency. Meth.* Art. *Cetologie,* p. 16.

THE small-eyed Cachalot, or black-headed Spermaceti Whale, is described by La Cépede as one of the largest, most cruel, and most dangerous inhabitants of the deep. The head is so monstrous as to equal the whole length of the animal, independent of the tail fin. The upper jaw is somewhat longer than the lower; and the teeth, which appear in the latter, are conical, curved, and hollow towards the roots. The eyes are extremely small. The

swimming paws are about four feet long. The dorsal fin is straight, high, and pointed. The whole length of the animal exceeds sixty feet, and the skin is of a black colour.

It inhabits the Arctic Ocean, and has occasionally appeared on the northern coast of Scotland. Its flesh is esteemed as a great delicacy by the Greenlanders, and it yields a great quantity o spermaceti, but it is not very productive of oil.

Class II.—AVES. (*Birds.*)

Vertebrated animals, with red and warm blood, respiring by lungs, and the young of which are produced from eggs; *feet* two; *bill* horny; *body* covered with feathers, and provided with wings, by means of which most of them are enabled to fly in the air.

VIII.

GALLUS SONNERATI.

Jungle Cock, Wild Cock, or Indian Pheasant.

Order Gallinæ, *Lin. Tem.* Gallinaces, *Cuv.*

Gen. Char. *Bill* somewhat thick, with the base smooth, convex above, slightly curved, and bent down at the tip; *nostrils* situated at the base, half covered with an arched scale, and open; *ears* naked; *head* surmounted by a crest or plume; *feet* four-toed, gressorial; anterior toes connected at the base by a membrane; *tail* compressed, and composed of fourteen feathers; *tarsi* with a long and bent spur; *wings* short.

Pl. 8.

Printed by C. Hullmandel.

Gallus Sonnerati.

London Published by John Wilson, Princes Street, Soho, February 1st 1831.

SPEC. CHAR. *Comb* toothed; *throat* wattled beneath; *feathers* of the neck elongated, spotted with white, black, and fulvous, with membranaceous tips; *throat*, *breast*, *abdomen*, and *back*, griseous lineated with white; *wing-coverts* reddish-chesnut; the *quill* and *tail* feathers deep black.

Phasianus Gallus; *Syst. Nat. Gmelin*, 737. Phasianus Gallus, var *a*.; *Lath. Ind. Ornith.* 625, 1. Wild Cock; *Lath. Gen. Syst.* 2, 2, 625, 1. Phasianus Indicus; *Leach*, *Zool. Misc.* ii. t. 61; *Shaw*, *Zool.* xi. t. 12. Coq Sauvage; *Sonnerat*, *Voy. Orient.* ii. p. 153, t. 94-95. Gallus Sonnerati, *Tem.*

THIS magnificent bird, commonly called the *Jungle Cock*, is a native of India, where it occurs in great abundance, in woods and forests. From this species it is that Sonnerat has asserted all our domestic fowls have originated; but as this opinion is not supported by evidence, and as the points of difference are very distinct, many naturalists of the present day, and among others Dr. Leach, dissent entirely from the generally received opinion. M. Temminck unhesitatingly denies the possibility of such an origin, and considers them as derived from more than a single stock, and that difference in point of form and plumage is independent of climate or accident. It is from the Javan Cock, of Latham, (Gallus *Bankiva*, Tem.) principally, that this celebrated ornithologist thinks our common domestic fowl has been obtained.

The Jungle Fowl of Sonnerat is somewhat smaller than our domestic cock; it has the beak horn-coloured, the comb notched, and the wattles similar to ours, in colour of a lighter or deeper red, but the bare space about the eyes, and on the throat, is larger in this species; the feathers on the head and neck become longer as they approach the body. They are remarkably distinguished from every other species of cock, in the size and flatness of the quills of these feathers, forming a white stripe throughout the whole length of the feather to the tip, where it becomes expanded into a round film of a cartilaginous structure, very delicate, and highly polished. The feathers of the back of the tail-coverts are long, narrow, of a brownish black, marked with lighter spots of the same colour, and

a broad white stripe in the course of the sterm; the under parts and thighs blackish, with a greenish hue; the primaries dull black; the secondaries black with a shade of green; the lesser and middle wing-coverts have their stems flattened, and expand at the tip, like the neck-feathers, but more thick and solid; these films are of a bright red colour; the tail-coverts are deep violet, very long, and arched on each plane of the tail, which consists of fourteen feathers, black and glistening with green. The feet are grey.

The female, which is smaller than the male, has neither comb nor wattles, and the throat is covered with feathers, in both which points it differs strikingly from our hens; the plumage of the under parts resembles that of the cock, but the colours are duller; the neck-feathers are not elongated, neither are they nor the wing-coverts furnished with the cartilaginous film observed in the male; the upper parts are greyish, and more or less inclining to black, with a streak of white extending along the stem of each feather. The annexed figure of the male bird was made from a fine specimen in the gardens of the Zoological Society; that of the female is copied from Sonnerat.

M. Temminck, who has written an admirable work on the Gallinacea, seems disposed to conjecture that the present species also inhabits some parts of South America. Acosta, who was the provincial of the Jesuits in Peru and Hispaniola, notices the existence of wild fowls prior to the arrival of the Spaniards in those countries; and Sonnini, during his travels in French Guiana, often heard them crowing in the woods. Stedman likewise informs us that, at Surinam, the common fowls are as good and plenty as in our own country, but smaller, and their eggs differ in shape, being more sharp-pointed. A smaller species of the dunghill kind, with rumpled inverted feathers, seems natural to Guiana, being reared in the inland parts of the country by the Indians or natives.

The races or breeds of the common Domestic Cock (Phasianus *Gallus*, Lin.; Gallus *domesticus*, Steph.), are exceedingly numerous; for, with the exception of the purely white individuals, scarcely any two are alike. The *Crested* Cock has the head orna-

mented with a crest, in addition to the comb, which in colour, often contrasts with the rest of the feathers: thus some birds are white, with a black crest; others black with a white crest; or the crest is black and orange, while the body is white, or varied with several colours. This breed occurs in many parts of England, and on the Continent, and is said to be less prolific than some others, but to fatten more readily. In Egypt it is much in request for the delicacy of its flesh. The *Bantam* and *Turkish* tribes are either identical, or, at least, very nearly allied, both being of small dimensions, and attired in shewy plumage. The hen lays a great number of eggs without sitting, and a *dwarf* variety, scarcely larger than the common pigeon, occurs in many parts of Europe and China, where it is reared on account of the fertility of the female. The *Dorking* Cock, of Latham, which is common in some parts of England, particularly about Dorking, in Surrey, is somewhat larger than the ordinary sort, and has *five* toes, two of which are placed behind. "The *Game-cock*," says a popular writer, "when in full plumage, and not mutilated for the purpose of fighting, has a fine and animated appearance. His head, which is small, is adorned with a spacious red comb and wattles; his eyes sparkle with fire; and his whole demeanour bespeaks boldness and freedom. The feathers on his neck are long, and fall gracefully on his body, which is firm, thick, and compact. His tail is long and arched; his legs are robust, and armed with sharp spurs, with which he defends himself and attacks his adversary. When surrounded by his females, his whole aspect is full of animation, and he admits no competitor; but, on the approach of a rival, rushes forward to instant combat, and either drives him from the field, or perishes in the attempt. To render his blows still more deadly, he is occasionally armed with an artificial spur, called a *gaffle*. The origin of cock-fighting is lost in the periods of remote antiquity; yet even the polished Athenians allotted one day in the year to this barbarous sport: the Romans seem to have borrowed it from the Greeks, and the ancient Britons from the Romans. So addicted was Henry VIII. to this inhuman spectacle, that he caused a commodious house to be built for its exhibition, and which still retains the name of the *Cock-pit*; and the practice was

perversely promoted in our public schools. In China the rage for cock-fighting is still more prevalent than in this country; and, in Sumatra, a man will hazard, not only his property, but his wife and children, on a favorite bird."

The domestic hen breeds more freely in warm than in cold climates. In this country and in France, if properly fed and accommodated with cold water, gravel, and a warm situation, she generally lays two eggs in the course of three days, and continues to do so upwards of ten months. In the more northerly climates, as in Greenland and Siberia, where they are kept as rarities, the species do not breed. For much valuable information on the most approved modes of managing domestic poultry, the reader may consult the above-mentioned work of M. Temminck, and Parmentier's excellent observations, under the article *Coq*, in the *Nouveau Dictionnaire d'Histoire Naturelle.*

The *egg* consists of four distinct parts; firstly, the calcareous investment or shell; secondly, the investing membrane; thirdly, the white or albumen; and fourthly, the yolk. The first of these, the shell, or *putamen* of the older anatomists, is composed of the carbonates of lime and magnesia, phosphate of lime, and animal matter. The investing membrane is albuminous, and possesses no important qualities, but was once esteemed efficacious in ague. The white, which consists of nearly pure albumen, is a viscid, transparent, colourless liquid; inodorous, insipid, and particularly distinguished by the property of coagulating when exposed to a temperature of about 165° Farh., into a white, opaque, tough, solid substance. Chlorine, iodine, alcohol, and many of the acids, also cause its coagulation, especially the sulphuric, nitric, and muriatic acids. The galvanic battery produces the same effect; and tannin, and several of the metallic salts, form insoluble precipitates with it, as the nitrate of silver, nitro-muriates of gold and tin, acetate of lead, and the bi-chloride of mercury, which is, perhaps, the most delicate test of the presence of albumen in animal fluids. Sulphuric acid has a very peculiar action on albumen. Dr. Hope, the able Professor of Chemistry in the University of Edinburgh, discovered, many years ago, that this acid immediately coagulates albumen, like the other strong acids, when

in a concentrated state, but dissolves it again when assisted by a gentle heat, forming a solution of a very fine red colour. The pure alkalies dissolve it, even when coagulated. In its natural or uncoagulated state, the white of egg soon putrifies, unless it be dried, when it assumes the appearance of horn, and may be kept in this state for an indefinite time. It contains small portions of free soda and sulphur, and hence it changes the vegetable blues to a green colour, and blackens metallic silver. According to the experiments of Dr. Bostock, white of egg consists of water 85.0, albumen 1.2, in 100 parts; and besides shews traces of uncoagulable matter 2.7, and salts 0.3, sulphuretted hydrogen gas, and benzoic acid. The yolk, or *vitellus,* is that well known spherical yellow mass, which occupies the centre of the albumen; it is included in an extremely delicate membrane, which is apparently without fibres, and is inelastic. In the common domestic fowl it is inodorous, and has a bland sweetish oily taste. It mixes readily with water, and forms a milky emulsion, which in France is termed *lait de poule,* or hen's milk. When heated it becomes solid, and yields by expression a yellow insipid fixed oil. Its principal constituents are water, oil, albumen, and gelatin; on the presence of the albumen depends the solidity of the boiled yolk, and the oil which it contains forms a saponaceous liquid when mixed with potash. Eggs may be preserved for a considerable length of time, by covering them with grease or immersing them in lime water, which prevents the admission of air through the pores of the shell. A fresh egg is translucent, or semi-transparent, but when it is opaque, or appears cloudy when placed between the eye and the light, it must be rejected.

Medical Properties and Uses.—The yolks of raw eggs are said to be greatly laxative, and have been thought serviceable in jaundice and obstructions of the liver. By the late Mr. White, of Manchester, and Professor Hamilton, of Edinburgh they have been highly extolled in the icterus of pregnant womne. In the form of emulsion, combined with mucilage and syrup, they are sometimes employed as a demulcent in coughs, hoarseness, and other pulmonary affections. Mixed with Rhenish, or other light wine, and rendered grateful by the addition of lemon juice and sugar, raw eggs are frequently prescribed in conva-

lescencies and other cases of debility. The white of eggs, when given in sufficient quantity, has been found to be the best antidote for the poisonous preparations of copper and corrosive sublimate. For this purpose it is recommended to diffuse the whites of eggs in cold water, in the proportion of one dozen of eggs to two pints of water, and administer a glassful of this mixture every ten minutes. M. Orfila, to whom we are indebted for this important discovery, found that when twenty-five or twenty-six grains of verdigris were mixed with the white of six eggs, the poison, which, if pure, would have killed a dog in three hours, did not cause death for seven days, and had no effect at all for five days, although the gullet was tied to prevent the mixture from being expelled.* M. Peschier, in the *Journal de Médicine,* xxxviii. 77, states that the white of one egg is required to render four grains of the poison inert. Egg shells are antacid, and when burnt have sometimes been used in medicine; but they differ in no respect from lime or chalk. The yolk is used in pharmaceutical operations, for rendering oils, camphor, and some other substances miscible with water. From its coagulability albumen is of great use in clarifying liquids; when dried it becomes a brittle transparent glassy-like substance, which, when spread thin upon substances, forms a varnish, and is accordingly much employed by book-binders for that purpose. It likewise possesses the property of rendering leather supple, for which purpose a solution of whites of eggs in water is used by leather-dressers; and hence it has been proposed to employ this solution in cases of contraction and rigidity of the tendons. Whites of eggs beaten in a bason with a lump of alum till they coagulate, form the alum curd of Riverius, and the *coagulum aluminis,* or alum cataplasm, of former editions of the London pharmacopæia, used as an astringent application to the eyes in chronic ophthalmia.

The ova of birds bear no inconsiderable analogy in alimentary properties to the milk of the mammalia, and forms a mild nutritious article of food, well suited to consumptive persons and debilitated constitutions. The eggs of the different species of the gallinacea, differ very little in alimentary properties; but those of the common

* *Toxicologie Generale,* i. 540.

domestic fowl, and the pheasant, are universally preferred for the delicacy of their flavour. Eggs contain much nourishment in a small bulk, and, as Dr. Cullen justly remarks, a smaller quantity of this than any other food will satisfy and occupy the digestive powers of most men. According to Lieutaud, and other writers, they are well adapted to those who are subject to acidities of the primæ viæ: but they are said to favour the secretion of bile, and so to disagree with those of a bilious temperament. The solubility of eggs depends much on their mode of preparation. To weak stomachs, they should only be immersed in boiling water a few minutes, so that the albumen be kept soft. Both the white and yolk of egg are rendered less digestible to the generality of stomachs when boiled to hardness. Eggs are distinguished by the peculiar quality of singularly affecting some persons; even the smallest quantity occasioning colic, febricula, heat, itching, and efflorescence of the skin. Eggs should be eaten when quite fresh, for when they approach to a putrescent state, they seem to be the most active and noxious of all the putrid substances. Taken to the quantity of even three or four grains, putrid egg has been known to occasion violent diarrhœa and dysentery. The flesh of the common domestic fowl affords a well known delicate and wholesome food. It is less stimulating and more easy of digestion than almost all animal substances; but it affords at the same time a less proportion of real nourishment. Broth made of the young fowl or chicken is diluent and restorative, and affords a very useful drink in cholera, diarrhœa, and other disorders of the stomach and bowels.

The flesh of birds is in general wholesome, but the Pheasant of the United States of America, is sometimes found to be poisonous, during the winter and spring. The cause assigned for this noxious quality is its feeding on the buds of the Kalmia *latifolia*, which is one of the few shrubs that preserves its verdure throughout the winter. Dr. Mease has published several cases which occurred in 1791 and 1792, in Philadelphia, where individuals dining on pheasants solely, were, in a few hours after, seized with giddiness, violent flushings of heat and cold, sickness at stomach, and repeated vomiting. These symptoms were soon succeeded by

delirium, weak pulse, and extreme debility, while some cases were marked by the preservation of the senses, but a total inability to articulate. They were generally relieved by emetics, diluents, and mild stimulants.* In a case which occurred to Dr. Drake, also in winter, vertigo, sickness at the stomach, with extreme languor and exhaustion, suddenly attacked the patient; the pupils were dilated, no pulse could be felt in the arms or temple, and excruciating pain of the stomach. These symptoms were somewhat relieved by an emetic; but tenesmus and griping remained for some time, and the patient gradually recovered.

Class III.—REPTILIA. *Reptiles.*

Vertebrated animals, with cold red blood, respiring by lungs; *body* naked, or covered with scales.

IX.

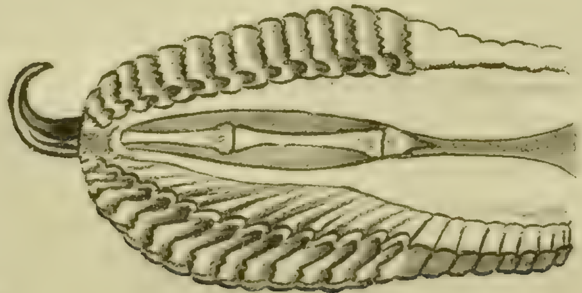
GECKO LOBATUS.

The House Gecko.

Class Amphibia, *Lin.* *Order* Sauria. *Fam.* Geckotidæ, *Cuv.*

Gen. Char.—*Head* and *body* depressed; *eyes* large; *tongue* fleshy and not extensile; *jaws* furnished with a row of very small and close-set teeth; *skin* shagreened above, with small scales or tubercles; *tail* with circular folds; *toes* five, widened along their margins or at their extremity, generally furnished with transverse scales beneath.

* *New York Medical Repository*, v. ix. p. 168, and v. xliv. p. 147.



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Gecko lobatus

SPEC. CHAR.—*Body* smooth, reddish grey, spotted with brown; *scales* and *tubercles* very small; *toes* free; *tail* round.

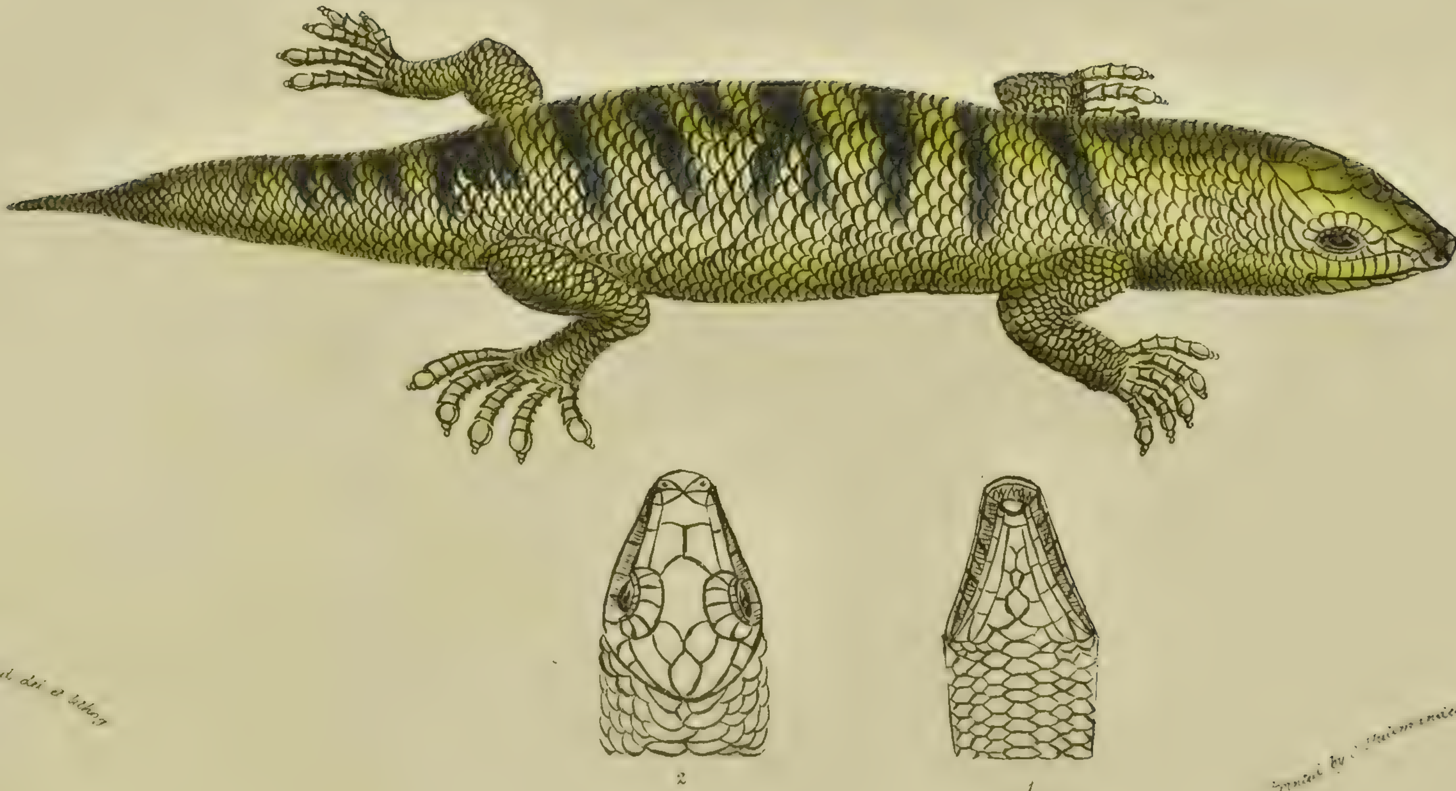
Stellio Hasselquistii; *Schn.* Thecodactylus lobatus; *Cuv.* Gecko ascolobates; *Merrem.* Gecko lobatus; *Geoffr. Rept. Egypt.* t. 3. f. 5.

THE Gecko *lobatus,* which several writers have described under the name of Lacerta *Gecko,* and of *L. Hazelquistii,* and which Baron Cuvier has figured under the title of *Gecko des Maisons,* or House Gecko, is a native of Egypt, and has long been celebrated for the noxious fluid which it secretes. It is a small species, measuring about five inches in length, from the point of the muzzle to the extremity of the tail. The general colour is a very pale reddish grey, spotted with brown. On the upper part of the body there are generally observed three longitudinal rows of broad round dots, one of which occupies the median line of the back; the two others are placed upon the sides. The plates which surround the margin of the jaws and mouth are of a bright yellowish green colour. The head is broad, somewhat triangular, much swelled out across the ears, depressed, and covered on its upper surface with small rounded prominent scales. The muzzle is taper; the eyes are very large and nocturnal; the tongue is thick, flat, and bifid at its tip, but not extensile, and the external opening of the ear is very apparent; the mouth is wide, and the jaws are furnished with a row of very small teeth. The body is long, slender, somewhat depressed, and covered with very minute round verrucose scales, irregularly disposed upon the head, the back, and the legs, but forming on the tail regular transverse rings. The tail is long and cylindrical, tapering, and equal in length to the rest of the body. The legs are rather long, and the feet have each five nearly equal toes; at the extremity of each toe is a circular expansion, which is divided in the middle to receive a small crooked claw. All the toes are covered on their inferior surface with small transverse imbricated scales, concealing glandular pores, from which exhudes a very poisonous fluid.

From the peculiar structure of their feet some of the species of this genus are enabled to attach themselves to the smoothest surfaces; and a very curious structure has been detected in the foot of this animal, by Sir Everard Home. It occurred to this gentleman, that this must be done by a contrivance like that of the Echineis *remora*, or sucking fish. Having procured from the late Sir Joseph Banks, a large specimen of the common Gecko, (Lacerta *Gecko*, Lin.), he was enabled to ascertain the peculiar mechanism by which the feet of the animal can lay hold of a smooth surface. This species, like the *G. lobatus*, has five toes, and at the end of each, except the thumb, is a very sharp curved claw. On the under surface of each claw are sixteen transverse slits, leading to as many cavities, or pockets, whose depth is nearly equal to the length of the slit which forms the orifice; they all open forwards, and the external edge of each opening is serrated like a small-toothed comb. A large oval muscle covers the claw of each toe, and from the tendons of these large muscles two sets of smaller muscles originate, one pair of which is lost upon the posterior surface of each of the cavities that lie immediately over them. The large muscles draw down the claws, and necessarily stretch the small muscles. When the small muscles contract, they open the orifices of the cavities and turn down their serrated edge upon the surface on which the animal stands. By this means vacua are formed, and the animal adheres to the surface by the pressure of the atmosphere.* Fig. 1, represents the under surface of one of the toes of the common or Egyptian Gecko of the natural size; fig. 2, is a toe dissected, to shew the appearance of the pockets on its under surface, and the small muscles by which they are drawn open; the parts being highly magnified.

The House Gecko is found in the different countries which border the Mediterranean Sea, to the south-east, particularly in Egypt, Arabia, Syria, and Barbary, from whence it is supposed to have spread through various parts of the south of Europe. In Egypt it is named *Abou-Burs* (father of the leprosy) because the inhabitants pretend that it causes this disease, by poisoning with

* See *Philosophical Transactions*, 1816, p. 149.



Scincus officinalis.

its feet all kinds of provisions over which it passes. Hasselquist, in 1750, saw a woman and a girl at the point of death, in consequence of having eaten some cheese, over which this reptile had dropt its poison. "Once," says he, "at Cairo, I had an opportunity of observing how acrid the exhalations of the toes of this animal are, as it ran over the hand of a man who endeavoured to catch it; there immediately arose little pustules over all those parts the animal had touched; these were red, inflamed, and smarted a little, greatly resembling those occasioned by the stinging of nettles."* The Gecko is driven from the kitchens at Cairo by means of garlic, to which it has a great aversion. Sparman mentions a Gecko which he saw at the Cape of Good Hope, which was regarded as exceedingly venomous; and Bontius speaks of an East Indian species, which is employed by the natives of Java to poison their arrows. He tells us that the venom of this hideous reptile is so dangerous that if the part affected be not immediately excised or burnt, death will ensue in a few hours. Its urine is also said to be one of the most corrosive poisons; and its blood and saliva are regarded as equally deadly.

X.

SCINCUS OFFICINALIS,

Officinal Scink.

Order SAURIA, *Brong. Cuv.*—*Family* SCINCIDÆ.

GEN. CHAR. *Body* long, covered with elliptical or rounded imbricated scales; *tongue* fleshy, little extensile, and slightly cleft; *jaws* with small close-set teeth, and two rows on the palate; *feet* with five toes, free and unguiculated.

* Hasselquist's *Voyages and Travels in the Levant*, p. 219.

Spec. Char. *Body* silvery yellow, with transverse blackish bands; *muzzle* short and pointed; *tail* compressed at the tip; margin of the *toes* serrated.

Scincus; *Raii Quadr.* 271; *Aldrov. Quadr. Ovip.* 658. Lacerta Scincus; *Lin. Syst. Gmelin*, i. 1077. Le Scinque Ordinaire d'Egypt; *Daud.* iv. p. 130. Le Scinque; *Lacep. Quadr. Ovip.* i. p. 373, t. 23. Officinal Scink; *Shaw, Zool.* iii. t. 79. Scincus Officinalis; *Laur. Amph.* 55, n. 87; *Geoffr. Rept. Egypt.* suppl. t. 2, f. 8.

The Officinal Scink has been long celebrated as a medicine among eastern nations, and once obtained a place in the British pharmacopœias. It is a small animal, seldom exceeding six inches in length, and is of a pale yellowish grey colour. The head is somewhat flattened and covered above with a few plates; the muzzle is conical, not pointed, but rounded at the end. The body is elongated and rather thick, entirely covered with round imbricated shining scales, and marked with several broad transverse blackish bands. The tail is of moderate length, thick at its base, pointed, compressed at the tip, and covered with scales similar to those on the body. The feet are slender, rather short, about of an equal length, furnished each with five long thin separate toes, serrated on their outer edge, terminating in a flat and pointed claw.—Fig. 1 exhibits the under side of the head; 2, the upper side of the same.

This species of Scink is found in Nubia, Abyssinia, and Egypt, from whence it used formerly to be brought to Europe by way of Venice and Marseilles. In its manners it is perfectly harmless; and so active in its motions, that it hides itself in the sand in an instant. It is so numerous in some parts of the East that Mr. Bruce says he saw several thousands of them at once in the great court of the Temple of the Sun, at Balbec. The ground, the walls, and scattered stones of these ruinous buildings were covered with them. According to this author, in Arabia it is named *El Adda*, and in Abyssinnia *Ahab*.

Medical Properties and Uses.—The Scink is one of those medicines which we owe to the superstition of former ages. The virtues for which its flesh has been extolled are extremely nume-

rous; but it has been principally recommended as a restorative, and as a remedy in elephantiasis, lepra, and other cutaneous diseases. In consequence of its reputed alexipharmic powers it entered as an ingredient into the old compound preparations which went under the names of *Theriaca Andromachi,* and *Confectio Damocratis.* "For a long time," says Mr. Griffith, "the Scink has been regarded as a remedy against certain maladies. Before this it was extolled by Pliny as a specific for the wounds caused by poisoned arrows; subsequently it has been vaunted as an aphrodisiac, and quackery or ignorance has placed it in the rank of those medicaments which merit the distinguished honour of being employed to reanimate the exhausted powers and to rekindle the fires of love, when exhausted by the frosts of age or at the expense of debauchery. Its flesh has been administered as depurative, excitant, anthelmintic, analeptic, anti-cancerous, sialagogue, and antispasmodic. Notwithstanding this confused mass of medical properties, thus put together without discrimination, as if to form the vade mecum of some empiric, now appears completely ridiculous, yet even at the present day, in many countries, fables are still published respecting the success of this remedy. In spite, however, of the discredit into which it has fallen among the faculty in general, it does not appear to be totally devoid of efficacy in some complaints."*

There is a large species of Scink, (*Lacerta occidua,* Shaw.) called the *Galley-wasp,* in Jamaica and the Antilles, where it is common, whose bite is believed—without sufficient evidence—to be extremely venomous, and causes immediate death.

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* *Animal Kingdom*, vol. ix. p. 323.

XI.

CROTALUS DURISSUS.

Lozenge-Spotted Rattle-Snake.

Class and Order AMPHIBIA SERPENTES, *Lin.* *Order* OPHIDIA. *Family* SERPENTES, *Cuv.*

GEN. CHAR.—*Head* broad, triangular, and flattened; with a hollow behind the nostrils. *Scales* carinated. *Shields* entire on the belly and under the tail. *Upper maxillary bones* destitute of common teeth, supporting only the poison *fangs* on each side. *Tail* with a *rattle*, formed of hollow, moveable, and sonorous cups.

* *Scales on the head similar to those on the back.*

SPEC. CHAR.—*Body* brown, with blackish lozenge-shaped spots, bordered with pale yellowish-white on the back; *neck* with blackish lines; *belly* yellowish-white, and not spotted; *rings* of the *rattle* from 1 to 14, deep brown.

Caudisona Durissa; *Laurenti, Spec. Med.* p. 93. Le Durissus; *La Cepede Hist. Nat. des Serpens*, p. 423. Teutlacouphitz; *Seba, Mus.* 2. t. 95, f. 2. Crotalus Durissus; *Linn. Syst. Nat. Gmelin*, i. 1081; *Shaw, Zool.* iii. t. 89.

TILL the discovery of America the formidable reptiles comprehended under this genus, celebrated for the danger which accompanies their bite, and the peculiar appendages to their tail, were unknown to Europeans, and from that period to the present day they have attracted the particular attention of naturalists. Fortunately the species are not very widely distributed, and those are all provided with a rattle, whence they derive their name, the noise of which gives warning of their proximity to those who may accidentally come within their haunts. They swarm in the less inhabited parts of the New World, but it has been observed that in proportion as the country is peopled the snakes decrease in

Crotalus durissus

numbers, and they are now almost extirpated in the neighbourhood of large towns. None are said to be found farther north than the mountains near Lake Champlain, but they infest South America even as far as Brasil. Rattle-snakes delight in woods and lofty hills, especially where the strata are rocky or chalky. There are at least three well characterised species, viz., Crotalus *durissus*, C. *horridus*, C. *miliarius*; and a fourth, C. *cascabella*, has lately been discovered by M. Spix, in Brasil.

The species here represented inhabits the warmer parts of North America, as far as the 45th degree of latitude. It is from four to six feet in length, and the thickness of a man's arm. The general colour is of a deep brown above, and marked along the back with a row of dark brown or nearly black lozenge-shaped spots, bordered with pale brownish yellow. On the upper part of the neck are three or four blackish lines. The head is large and flat, of a triangular shape, and covered with scales similar to those on the back; but those on the muzzle, and those which cover the eyes, are larger, and in the form of plates. The rostrum is obtuse and truncated; and there is a small rounded fosset behind each nostril. The scales of the back are carinated, of an oblong oval form; those of the lateral row, immediately above the abdominal scuta, broader and somewhat rhomboidal. The shields are entire on the belly and below the vent. The opening of the mouth is wide, and in the upper jaw, on each side, is armed with crooked teeth, which diminish in size in proportion as they recede from the muzzle. The eyes are large, exceedingly brilliant, and furnished with a nictitating membrane. The tail is rather thick, and furnished with a dark brown coloured rattle.

To Thomas Bell, Esq. F. R. S., New Broad Street, I am indebted for the fine specimen from which the drawing on the annexed plate was made, and who, with the frank liberality that characterises a mind ardent in the pursuit and advancement of science, has allowed me the use of his splendid collection of this department of natural history.—Fig. 1 exhibits the under side of the head; 2, the upper side of the head; 3, a section of the rattle.

From a paper published many years ago, in the Philosophical Transactions, by Dr. Tyson, on the anatomy of the Rattle-snake,

it appears that its internal structure, in almost all respects, resembles the viper. The following is Dr. Shaw's abstract from the account given by Tyson of the more important anatomical peculiarities of that reptile.

"The wind-pipe, as in the viper, as soon as it enters the lungs, consists of semi-annular cartilages, which being joined at both ends to the membrane of the lungs, constitute a free or open channel, thus immediately transmitting the air to the vesicles of these organs which are of very great length, beginning near the throat, and running down three feet in length. The upper part of them, for the distance of about a foot from their origin, is composed of small vesiculæ or cells, as in the lungs of the frog; and which, from the frequent branchings of the blood-vessels, appear of a florid red; this part tapers proportionally to the body; the lowest part of it near the heart being moderately blown, is about five inches and a half in circumference; a little lower, for the space of about four inches, the cells gradually disappear, so that they seem at last to form only reticular compages of *vavulæ conniventes* in the inside of the membrane of the lungs; the greatest circumference here is about six inches; the remaining part of the organ is merely a large bladder, without any cellular subdivisions, and consists of a strong transparent membrane the circumference of which, when inflated, is about eight inches and a half. The lungs in the water-newt, and some other animals, are divided into two large lobes, without cellular subdivisions; in the frogs, crocodiles, &c. of two lobes with cellular divisions, while in the rattle-snake and viper, both these kinds of structure are comprised, the anterior part of the organ being filled with numerous vesicular subdivisions, while the remaining part is mere lengthened bladder.

"The œsophagus, or gullet, was two feet three inches in length, and marked by two distinct enlargements of very great size, so as to represent two preparatory stomachs as it were; nor was the real or proper stomach capable of so much distention as these; the length of the true stomach or third enlargement, was nearly similar to that of the second enlargement of the œsophagus; it was much thicker than that part, and resembled in its structure that of the viper. From the pylorus the duct straightened again for about

half an inch, and then formed a large intestine, the weaved ridges of its external coat presenting a curious and pleasing spectacle. The intestine, after some small windings, terminated in the rectum, which was of much smaller diameter. In the promiscuous food which serpents take in, which they always swallow whole, and in which there are always some parts unfit for digestion, and which must therefore be returned, the œsophagus here being very long, nature has provided the above-mentioned swellings or enlargements of that part where they may be respited during the efforts made use of by the animal for that purpose, till collecting its force, it gives them as it were another and another lift, and at length ejects them; and if what is confidently affirmed be true, that, on occasion of danger, they receive their young into their mouths, there are fit places for receiving them.

"The heart was placed near the bottom or base of the trachea, on the right side of it; its length was an inch and a half, and its figure rather flat than round, encompassed by the pericardium. It had only one ventricle, the valves being small and fleshy, and the inside of the ventricle distinguished by four or five cross furrows.

"A little below the heart lay the liver, which was about an inch wide in the largest part, and seemed divided on one side by the vena cava into two lobes of an equal length; that on the left side being about ten inches, and that on the right a foot long. Its colour was a brown red, and its use, no doubt, the secreting of the gall, which was contained in a bladder, seated at some distance below it.

"The fat in this animal was very plentiful, and the membrane to which it adhered seemed to be the omentum, which encompassed all the parts contained in the lower belly, and was joined to both sides of the ribs, running from thence to the rectum, and forming a bag which enveloped the parts there, but was free, and not conjoined towards the belly. There was no diaphragm, or separation between the heart and lungs, and the abdominal viscera.

"The kidneys, which lay towards the back on each side of the spine, were not very firmly conjoined, and were about seven inches in length, that on the right side somewhat exceeding that on the

left; each was about an inch in diameter, and though forming one continued body, yet plainly distinguishable into several smaller kidneys, to the number of fifteen.

"The tongue was in all respects like that of the viper, being composed of two long and round bodies, contiguous, and joined together from the root, to half its length: this part may be retracted or darted out at the will of the animal; that part which is thrown out being of a black colour, while the remainder or sheathed portion is red.

"The teeth are of two sorts, viz. the smaller, which are seated in each jaw, and serve for catching and retaining the food; and, secondly, the fangs, or poisonous teeth, which kill the prey, and are placed without the upper jaw. Of the first sort of teeth are two rows on each side, viz. five in a row of the inward less than the outward, there being twenty in all. In the upper jaw there are only sixteen, viz. five on each side, placed backward, and six before. These do no harm, which was known of old to mountebanks, who, to give proof of the efficacy of their antidotes, would suffer themselves to be bitten by vipers, but first took care to spoil them of their fangs. The fangs are placed without the upper jaw, towards the fore part of the mouth, not fastened in the maxillæ as the other teeth. The fangs were not to be perceived on first opening the mouth, lying concealed under a strong membrane, or sheath; but at pleasure the animal can raise them, as a cat or lion does its claws. These fangs were hooked and bent, like the tusks of the babyrousa, but some of the smaller ones were bent at right angles; on each side we meet with about six or seven of these. In all these teeth was a pretty large foramen, or hole, towards the root of it, and towards the point was a plainly visible large slit, sloping like the cut of a pen, the part from the slit being perfectly hollow; and on pressing gently with the finger on the side of the gum, the poison, which was of a yellowish colour, was readily perceived to issue from the hollow of the tooth through the slit."

The rattle, which occurs as an appendage to the tail, is composed of a number of semitransparent rings, received upon each other, the first only being firmly attached to the last caudal vertebra, whilst the others are very moveable upon one another. The

first formed cup of the rattle is connected directly with the scales on the back, and, by the intervention of a row of small scales, with the shields on the belly. Each cup consists of two quadrangular pyramids, which are joined together by their points and flattened laterally; that nearest the tail is much the largest, hollow within and convex externally, whilst that which is towards the tip is nearly flat, and receives upon it the hollow pyramid of the next ring, the base of the former making a projection, over which the second ring cannot slip; in this mode the larger pyramid, which is somewhat of an oval shape, with its long axis from above downwards, is seen, except at the tip of the rattle where both are visible, and shew the formation of each ring, and the shape of the last caudal vertebra, upon which each is formed as upon a mould. The number of cups found in a rattle depend upon the age of the snake, and these are said sometimes to amount to twenty or thirty; their usual number, however, is from five to fourteen. When the reptile moves its body, the cups of the rattle likewise moving upon one another, make a noise, which has been compared, though not very correctly, to the folding of dried parchment. This noise is distinctly audible at the distance of twenty or thirty feet, but as the cups consist merely of dried matter, which in the dry season is brought into a condition to make a noise when the animal moves, so in like manner, under the influence of external circumstances, the rattle in the wet season is soft and mute.

The Rattle-snakes are slow inactive creatures, and seldom attack a man unless molested; but this is often done unguardedly by treading on their haunts. They usually rest twisted in a spiral form, in places which are clear of grass and wood, where they lay wait for such ill-fated animals as chance to prowl within their reach. Their bite is almost uniformly fatal, even to the largest animals; and the latter frequently evince such an instinctive dread of them, that, according to M. Bosc, it is almost impossible to compel a horse or dog to advance towards them. Their food consists principally of the smaller quadrupeds, such as squirrels, rabbits, rats, hares, and small birds. It was long believed, and the notion is still popularly current in America, that they possessed the power of charming, as it is commonly called, or fascinating their victims,

which were thought to be so completely under the influence of their glance as to precipitate themselves of their own accord into the open throat of their enemy. In a memoir on the supposed fascinating power of the Rattle-snake by Dr. Barton, Professor of Natural History in the University of Pennsylvania, this is, however, contended to be nothing more than the fluttering of old birds in defence of their young, when they perceive the snake lying in wait for prey, and which are themselves caught, as well as their young, by the Rattle-snake, unless they save themselves by a timely retreat.

The Rattle-snake is a viviparous animal; producing its young in the month of June, generally about twelve in number, and which by September acquire the length of twelve inches. It is said to protect its young in the same manner as the common viper, namely, by receiving them into its mouth and swallowing them. Like most other reptiles, the Rattle-snakes retire during winter into holes, in which they remain in a torpid state until the return of spring, when they creep out of their hiding places in a weak and languid state. Their flesh is eaten by the Indians, who also apply their fat to various medicinal or superstitious uses.

The animal when provoked to bite rolls itself up in a spiral form, and shaking its rattle, gives the warning alarm, before it darts out. If the unfortunate victim removes from it, it elongates itself gently, and creeps in a right line, keeping its rattles raised, and shaking them from time to time. If it is provoked again it stops and resumes its spiral figure; it moves its rattles with rapidity, its head and neck become flattened, its cheeks swell, its lips contract, its jaws widely separated allow the formidable fangs to appear; its eyes become red as flame, it darts out repeatedly its long and forked tongue, its whole body swells with rage, rising and falling like a pair of bellows; it threats, but it never springs forward unless sure of its aim.

The bite of the Rattle-snake generally proves fatal, but its effects vary greatly according to the health and size of the animal, and consequently the greater or less intensity of the poison. Laurenti says that when one has been bitten by a Crotalus, the entire body is swelled, the tongue becomes prodigiously enlarged,

the mouth is parched, and an inextinguishable thirst takes place; the edges of the wound become gangrened, and at the end of five or six minutes the victim dies in frightful agony. The poison is secreted by a gland of considerable size, situated beneath the eye, the excretory duct of which terminates on each side at the base of the long tubular fang in the upper jaw, which is concealed when the animal is at rest in a fold of the gum, but is capable of being raised instantaneously when the animal is irritated, and about to inflict the fatal wound.

Opportunities of tracing the symptoms produced by the bite of poisonous snakes, and ascertaining their local effects upon the human body when the bite proves fatal, in this country, are extremely rare. In the Philosophical Transactions for 1810, Sir Everard Home has given an interesting case of a man who was bitten by a Rattle-snake, of which the following is an abstract. Thomas Soper, a spare man, about twenty-six years of age, whilst teazing a Rattle-snake with a foot rule, dropped it into the cage, and incautiously opening the door to remove it, the snake immediately darted at the hand, and bit him once on the thumb and a second time on the fore-finger. This happened about half-past two o'clock, October 17, 1809. He went immediately to a chemist in the neighbourhood, who, imagining him to be intoxicated, from his language and behaviour, gave him a dose of jalap, and made some trifling application to the bites, but the hand at this time had not swelled. In about half an hour the swelling had extended half way up the fore-arm, and he was admitted into St. George's Hospital. The skin on the back of the hand was very tense, and the part very painful. At four o'clock the swelling had extended to the elbow; and at half-past four it had reached half way up the arm, and the pain had extended to the axilla; the skin was cold, pulse quick, conversation incoherent, and he complained of sickness. Forty drops of ammonia and thirty drops of ether were given in an ounce of camphor mixture, but did not remain on his stomach; the wounds were bathed with aqua ammoniæ puræ, and the extremity had compresses wetted with camphorated spirits applied to them; in two hours after, the ammonia and ether were repeated and retained, and the same

medicine was given three times in the course of that evening; at a quarter after nine the pain had become excessive, and he was attacked with fainting fits every fifteen minutes; in the course of the night his pulse became very quick, and he began to talk indistinctly; the medicine was given every hour. On the following day the pulse had risen to 132, and was very feeble; the swelling had not extended beyond the shoulder into the neck, but there was a fullness down the side, and blood extravasated in the cellular membrane, as low as the loins on the right side; the hand and arm very cold, painful when pressed, and vesicated just above the elbow on the inside of the arm; the warmth of the body had returned, but the patient was very low; and as there was recurrence of vomiting, so that the stomach could not retain even brandy, two grains of opium were ordered to be taken every four hours; the faintings still recurred; the vesications and red spots continued to increase in size.

The opium was left off on the following day (October 19), and he was ordered to take as much wine and brandy as could be got down. Two days after he was occasionally delirious, and the irritability of the stomach continued, so that the brandy and jelly only were retained. On the 22nd, his pulse having become full and strong, wine was ordered instead of brandy. Six days after a slough formed on the arm, and he was attacked with diarrhæa. On the 29th his pulse became quick and feeble, and an abscess on the outside of the elbow being opened, discharged half a pint of a reddish brown pus, mixed with sloughs of cellular membrane; bark was ordered, but given up the next day, in consequence of the recurrence of the diarrhæa. He continued gradually to sink, vomiting still continued, mortification took place in the axilla, and he died in the afternoon of the 4th of November, eighteen days after being bitten. On dissection, the body externally was found natural, with the exception of the arm that had been bitten. The wounds made by the fangs were healed; the lungs were healthy; the cavities of the heart contained coagulated blood; the cardiac portion of the stomach was moderately dilated with fluid; while the pyloric portion was much contracted, the internal membrane had its vessels gorged with blood. The intestines and liver were

healthy. The vessels of the brain were turgid, and water effused in it. Such is the account of Sir E. Home's case; but in ordinary cases, where the bite is inflicted by a healthy snake, the local irritation is so sudden and so violent, and its effect on the general system so great, that a person will die in a few hours.

Dr. Brickell mentions, that he saw a fight between a dog and a Rattle-snake, in which, after two bites, the dog died in less than half an hour, as did also the snake, which had bitten itself in the second encounter. Capt. Hall, in the Philosophical Transactions, relates that a dog which was exposed to the bite of a Rattle-snake died in fifteen seconds; a second dog was destroyed in two hours; and a third died after three hours. After four days he had a dog bitten by the same snake, and it died in thirty seconds; another was destroyed in four minutes. Three days after, a frog was killed by the same snake in two, and a fowl in three minutes. And some time after, the animal having bitten itself died in twelve minutes.

In the *treatment* of poisoning by the Rattle-snake, and other venomous serpents, the first object is, if the case has been seen at a sufficiently early period, to prevent the passage of the virus from the wounded part towards the centre of circulation. For this purpose, a ligature should be applied between the situation of the injury and the heart; but the most certain mode of removing the poison consists in the excision of the bitten part. The wound should be immediately sucked with all the power the mouth is capable of exerting; and the suction should be persisted in for a considerable length of time, together with scarification to the full depth of the wound. The practice of sucking out poisons is of great antiquity, and if it be done very early will, in many cases, be attended with the most beneficial results. The Psylli of Africa, and the Mersi of Italy, were celebrated for curing the bites of poisonous animals, by sucking the wounds; and we are informed that the Indians of North America practice the same treatment at this day. If the bite be inflicted on a part upon which a ligature cannot be applied, the wounded portion should be destroyed with caustic or the actual cautery. The caustic which Fontana recommends, was potass; but the liquid caustics are commonly preferred, especially the mineral acids, because their action is quicker, and

they penetrate more readily to the bottom of the wound. From the experiments of Dr. Barry, Professor Mangili, and others, it appears that the application of cupping-glasses, as prescribed by Celsus, is a remedy which may prove extremely useful in all cases of bites inflicted by venomous animals.

With respect to the general measures, experience has shewn that medicines of a stimulating nature are best calculated to remove the powerfully depressing influence that is exerted over the nervous and circulating systems, by this class of animal poisons. The volatile alkali, spiritus ammoniæ succinatus, sulphuric ether, and oleum terebinthinæ, are the remedies usually employed. Of these the liquid ammonia, administered internally, in the dose of from fifteen to twenty drops, every two hours, is generally regarded as having the best title to the character of a specific for the bites of venomous serpents. In South America, where venomous snakes are very numerous, the expressed juice of the Mikania *guaco*, a plant described and figured by Humboldt, is generally esteemed as the best remedy for the bites of poisonous serpents. The roots of Polygala *Senega*, Aristolochia *serpentaria*, *anguicida*, and *longifolia*, Prenanthes *alba*, and the bark of the tulip-tree, are also recommended.*

CROTALUS HORRIDUS.—*Banded Rattle-snake.*

Spec. Char. *Body* brown, with transverse irregular blackish bands; extremity of the *tail* black; *length* five feet.

C. Horridus, Lin.; *Catesby, Carol.* ii t. 41; *Shaw Zool.* iii. t. 88.

The Boiguira, or banded Rattle-snake, inhabits various parts of America, and is found from four to six feet in length. It may be distinguished from the preceding species by the different disposition

* The Crotalus *rhombifer* of Boie, and C. *cascavella*, Spix, *Serp. Brasil.* t. 24, appear to be varieties of the present species.

of its colours, being of a yellowish-brown, marked throughout its whole length with transverse irregular blackish bands. The under parts are of a paler colour, and spotted with numerous dusky variations or freckles. It is named *boicininga* by Piso and Margrave. The Mexicans, according to Hernandez, call it *teuhtlacot zauhqui,* which signifies *queen of serpents*; the Portuguese of Brasil call it *cascavella,* and the natives designate it under the terms *boiguira* and *boicininga.* The bite is considered more fatal than that of the former species.

CROTALUS MILIARIS.—*Miliary Rattle-snake.*

* *Head covered with shields.*

Spec. Char. *Body* greyish-brown, with a red line along the back, interrupted by a series of black spots, bordered with white; *sides* and *under parts* with smaller spots; *length* two feet.

Vipera Caudisona Americana minor; *Catesby*, *Carol.* ii. t. 42. Crotalophorus Miliaris; *Gray.*

The upper part of the head is covered with broad scales, placed in four rows; the back is of a greyish-brown colour, marked with a longitudinal stripe of red, which is broken by several small spots, edged with white; the sides and belly spotted with black. This species has been described by Catesby under the name of the viper of Louisiana; its small size and its colour prevent its being readily seen, and its rattle can hardly be heard, even when held in the hand; and persons are thus exposed to walk or even to sit upon it. In the United States this serpent is considered as more dangerous than the *durissus.* According to M. Lebeau, ammonia is the remedy which is employed as an antidote to its bite with the greatest success.

XII.

VIPERA BERUS.

Common Viper, or Adder.

Gen. Char.—*Scales* on the head rough or granulated; *plates* under the tail divided; *neck* narrow; *poisonous fangs* in the upper jaw.

Spec. Char.—*Body* brown, with a black zigzag line along the back, and a row of black spots on each side; *belly* slate-coloured; *length* two feet.

Εχις; *Arist. Hist. An.* lib. iii. c. 1. Vipera; *Virg. Georg.* iii. 417; *Plin. Hist.* lib. x. c. 42; *Gesner, Serp.* 71; *Raii, Syn. Quadr.* 285. Coluber Berus; *Lin. Syst.* i. 337; *Shaw, Zool.* iii. t. 101. Viper; *Pennant, Br. Zool.* iii. p. 36, t. 5. Berus subrufus; *Laurenti,* 97, t. 2, f. 1. La Vipre Commune; *La Cepede, Hist. des Serp.* ii. t. 1.

Le Vipre, Fr.; *La Vibora,* Sp.; *Die Europäische Natter, Otter,* Ger.; *Smea; Echidna,* Russ.; *Otterflauge; Hugg-orm,* Dan.; *Hugg-orm,* Swed.

So celebrated for poison have the bites of some serpents been, that in the earlier ages they were held sacred as the ministers of divine wrath; and in more enlightened times the figure of a viper was added to the busts of eminent physicians, as an acknowledgment of that skill which could avert the dangers apprehended from the wounds inflicted by these reptiles. Fortunately for the inhabitants of this country we possess but few venomous animals; and these even but rarely occasion serious injury, and still seldomer those fatal consequences which so often succeed similar accidents in hot climates.

The Viper is found in all the woody, mountainous, and stony districts of the temperate parts of Europe. It is common on the borders of dry coppices, on heaths, and in dry sandy situations exposed to the sun, and occurs throughout the whole of France,

Vipera Berus.

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Italy, Spain, the British Isles, Germany, Sweden, Poland, Russia, and even as far northward as Siberia and Norway. A variety has been described, by M. Paulet, which has very recently multiplied to an alarming extent, in the forest of Fontainbleau, where it was known under the name of *aspic,* or asp.

The general colour is brown, with a slight tinge of ash-grey or red, but it varies from pale ferruginous-yellow to a deep brown or black. Along the back runs a chain or series of confluent rhomboidal spots, extending in a straight line from the back of the head to the extremity of the tail, and a stripe on each side of dusky roundish or subtriangular spots. The head is broad and bulges out behind, which distinguishes it from the common ringed snake (*Coluber natrix,* Lin.), and is marked above with a large divided somewhat heart-shaped black mark, or spot. The space between the eyes is covered with two large plates, and on the muzzle are several smaller ones. The opening of the mouth is wide, the tongue forked, soft, flexible, and capable of great extension, the edges of the jaws covered with large scales, barred or variegated with black and light grey, or whitish marks. The dorsal scales are oval, carinated, imbricate; inferior lateral ones subangular and plain. The under surface of the body is ochreous, or dusky tinged with blue. The abdominal scuta vary in number from 142 to 148; the pairs under the tail from 30 to 40. The usual length of the animal is about two feet, though individuals are sometimes found of much greater length, measuring nearly three feet. The fangs of the viper, like those of most other poisonous serpents, are situated on each side of the anterior part of the upper jaw, and are two in number, with a few very small ones behind, apparently intended by nature to supply the place of the former when lost either by age or accident. They are curved, hollow, about a quarter of an inch in length, lying flat in the gum when the mouth is closed, and raised by muscles so as to project and become perpendicular with the jaw when the animal is about to bite. The apparatus by which the poison is secreted consists of a gland behind each orbit, and of a membranous sac at the lateral and anterior part of the upper jaw, seldom containing more than three or four drops of a yellowish liquid, which is conveyed thence by an excre-

tory duct to the cavity of the tooth which communicates with that of the sac, and terminates near the tip in a small aperture, by which the poison is expelled into the wound made by the tooth. The poisonous fluid is propelled into the hollow of the curved fang by a small constrictor muscle, which, however, never expels at once the whole of the contents of the sac.

As this species is subject to great differences in colour, depending on age, sex, or climate, it has been multiplied into the following species, which Dr. Leach, in the third volume of his Zoological Miscellany, has reduced to the rank of varieties:

1. *Black Viper,* Coluber Prester, *Lin. Syst. Nat.* i. 377. Colour nearly black.

2. *Blue-bellied Viper,* Rev. Revett Sheppard, *Lin. Trans.* vii. p. 56. In this the back is more tinged with brown than usual, and the belly is of a rich shining blueish-black colour, somewhat resembling that of polished steel.

3. *Red Viper,* Rev. Thos. Racket, *Lin. Trans.* xii. p. 349. This is supposed to be the *Coluber Chersea,* of Linneus. Above, it is of a bright red colour, and is characterized by a heart-shaped mark on the head, and a dark spot near the extremity of the tail. It is extremely rare in this country, but has been found on Cranborne Chase, in Dorsetshire, where it is known to the gamekeepers under the name of "red viper." It has likewise been found by the Rev. Revett Sheppard, in the parish of Levington, and other places in the county of Suffolk, in arid waste situations.

The two varieties figured on the accompanying plate were taken in the neighbourhood of Harrow on the Hill, near London, last autumn.

This reptile is viviparous, pairing in May, and producing from twelve to twenty-five young at a birth, towards the close of summer. It feeds on insects, lizards, frogs, and mice. It retires into holes in the earth, where it becomes torpid during winter, and, like all other snakes, can support, without any material suffering, a fast of many months.

The poison of the Viper is a yellow liquid, inodorous, insipid, and when applied to the tongue occasions numbness. It has the appearance of oil, before the microscope, but it unites readily with

water. It produces no change in vegetable blues. When exposed to the open air the watery part gradually evaporates, and a yellowish-brown substance remains, which has the appearance of gum-arabic. In this state it feels viscid between the teeth; it dissolves readily in water, but not in alcohol; and alcohol throws it down in a white powder from water. Neither acids nor alkalies have much effect upon it. It does not unite with volatile oils nor the sulphuret of potass. When heated it does not melt, but swells, and does not inflame till it becomes black. These properties are similar to those of gum, and from the observations of Dr. Russel there is reason to belive that the poisonous juices of other serpents are analogous in their properties to those of the Viper.

The activity of the poison of the Viper depends on a variety of circumstances, but it is most hurtful when mixed with the blood. If the mouth be not excoriated, it may be swallowed in considerable quantity without causing any serious injury. A pupil of Professor Mangili swallowed the whole poison of four Vipers, and that of six was given to a blackbird with no other effect than that of slight and transcient stupor. It appears to be most active in hot climates, in the middle of summer, the period when the animal is most vigorous and active. Its comparative effects upon various animals appear to be regulated by the size of the animal bitten. Small birds and quadrupeds die immediately when they are bitten by a Viper, but to an adult person the bite seldom proves fatal.

The local symptoms which follow the bite of a Viper, are an acute pain, in the part wounded, with a swelling, at first red, but afterwards livid, which by degrees spreads rapidly over the neighbouring parts, and even affects the viscera, and internal organs. A sanious fluid is sometimes discharged from the wound, around which phlyctenæ arise, similar to those of a burn. After a short time the pain abates considerably, the inflammatory tendency changes into a doughy, or œdematous softness, the part grows livid, and the skin exhibits large livid spots, like those of grangrene. The general symptoms generally come on within forty minutes after the injury; the patient is troubled with anxiety, prostration of strength, tendency to fainting, bilious vomiting, diarrhæa, sometimes convulsions, quick, small, irregular pulse, difficult breathing,

figure of this interesting animal. The Cerastes, which grows to the length of two feet or more, is readily distinguished by a pair of corneous quadrangular curved processes, situated immediately above each eye, and pointing forwards; these processes, or horns, as Dr. Shaw justly observes, have nothing analagous in their structure to those of quadrupeds, neither are they to be considered as weapons either offensive or defensive, but they contribute to give the animal an appearance of more than ordinary malignity. These processes are wanting in the females; they are connected with the skin merely, and covered at the base with minute scales. The general colour of this snake is a pale yellowish or reddish-brown, with a few rather large, distant, round, or transversely oblong spots, of a darker colour, disposed on the upper parts of the body, and along the sides; the belly is covered with broad plates of blueish or pale lead colour, and in some specimens nearly white. The head is triangular, compressed, obtuse before, gibbous at the posterior part, larger than the neck, which is very narrow, and covered with small granular scales similar to those on the back. According to Mr. Bruce, it has sixteen small immoveable teeth, and in the upper jaw two canine teeth, or poisonous fangs, hollow, crooked, and finely polished. The horns are about a quarter of an inch in length, pointed, channelled longitudinally, and surrounded at the base with a circle of small scales. The body is covered above with ovate, imbricate, carinated scales; the neck is narrow; the tail short, tapering, pointed, and covered underneath with a double row of small plates.

The Cerastes inhabits the burning sandy deserts in the hottest regions of Northern Africa. It is very common in Egypt, Arabia, Syria, and is also found in many parts of Abyssinia. It is very nearly allied to the common viper, and its bite is, perhaps, still more to be dreaded; since it moves with great rapidity, and is said to possess a propensity to springing to a considerable distance, and assailing, without provocation, those who happen to approach it. During the day time, the Cerastes hides itself in the sand, and sometimes gets possession of the hole formed by the jerboa.

" The poison," says Mr. Bruce, " is very copious for so small a creature; it is fully as large as a drop of laudanum, dropt from

a phial by a careful hand. Viewed through a glass, it appears not perfectly transparent or pellucid. I should imagine it had other reservoirs than the bag under the tooth, for I compelled it to scratch eighteen pigeons upon the thigh, as quickly as possible, and all died nearly in the same interval of time; but, I confess, the danger attending the dissection of the head of this creature, made me so cautious that any observation I should make upon these parts, would be less to be depended upon. I kept two of these last-mentioned creatures (the Cerastes) in a glass jar, such as are used for keeping sweetmeats in, for two years, without having given them any food—they did not sleep, that I observed, in winter, but cast their skins the last days of April. The Cerastes moves with great rapidity, and in all directions, forward, backward, and sideways. When he inclines to surprise any one who is too far from him, he creeps with his side towards the person, and his head averted, till judging his distance, he turns round, springs upon him, and fastens upon the part next to him; for it is not true what is said, that the Cerastes does not le or spring. I saw one of them at Cairo, in the house of Julian and Rosa, crawl up the side of a box, in which there were many, and there lie still, as if hiding himself, till one of the people who brought them to us came near him, and though in a very disadvantageous posture, sticking as it were perpendicular to the side of the box, he leaped near the distance of three feet, and fastened between the man's fore-finger and thumb, so as to bring the blood. The fellow showed no signs either of pain or fear, and we kept him with us full four hours, without his applying any sort of remedy, or his seeming inclined to do so. To make myself assured that the animal was in its perfect state, I made the man hold him by the neck, so as to force him to open his mouth, and lacerate the thigh of a pelican, a bird I had tamed, as big as a swan. The bird died in about thirteen minutes, though it was apparently affected in about fifty seconds; and we cannot think this a fair trial, because a very few minutes before it had bit the man, and so discharged a part of its virus, and it was made to scratch the pelican by force, without any irritation or action of its own."

Mr. Bruce vouches, from his own observation, for the reality of the incantation of serpents. At Cairo, he saw a man take a

Cerastes, with his naked hand, from a number of others at the bottom of a tub, put it in his bosom, twist it about his neck, and last of all eat it with as little repugnance as if it had been a stock of celery. All the black people of Sennaar are perfectly armed against the bite of either scorpion or viper. They take them without scruple in their hands, and toss them to one another like balls, without irritating them so much as to bite. The creature, however lively before, when seized by one of these barbarians, always appeared languid and feeble, frequently shut his eyes, and never turned his mouth towards the arm of the person that held him; yet, when a chicken was made to flutter before him, his seeming indifference left him; he bit it with great signs of rage, and the chicken died almost instantly. These people pretend to possess a natural exemption from the noxious power of serpents; and, by certain medicines, can communicate this exemption to others. The Arabs acquire it from their infancy, by chewing a certain root, and washing themselves with an infusion of certain plants in water. Though the drugs were given to Mr. Bruce, and he several times fortified himself for the experiment, his resolution always failed him at the moment of trial.

As no antidote is known to the bite of this poisonous reptile, the sufferer can only be treated medicinally on general principles. Avicenna recommends, absurdly enough, to give the patient a grain of horse-raddish, in wine, or to cover the wound with an onion, pounded in vinegar. Celsus says, "at si cerastes, aut dipsas, aut hæmorrhois percussit, asphodeli, quod Ægyptiæ fabæ magnitudinem æquet, arefactum, in duas potiones dividendum est, sic, ut ei rutæ paulum adjiciatur. Trifolium quoque et mentastrum, et cum aceto panaces æque proficiunt. Costumque, et casia, et cinnamomum recte per potionem assumuntur,*

* *De Med.* lib. v. c. 27, p. 261.

VIPERA NASICORNIS.—*Horn-nose Snake.*

Spec. Char.—*Body* olivaceous yellow, variegated with black; a flexuous pale fascia on the sides, *snout* furnished with two sharp-pointed horns.

Coluber nasicornis; *Shaw, Nat. Miscell.* iii. t. 94.

This remarkable species was first described by Dr. Shaw, in the Naturalist's Miscellany. It is distinguished by two large pointed horns, situated, not as in the Cerastes, above the eyes, but on the top of the nose, or anterior part of the upper jaw. These horns are somewhat flexible, triangular, inclined slightly backwards and outwards, and at the base of each horn is a small erect scale of nearly the same shape with the horn itself; thus giving the appearance of a much smaller pair of horns. The mouth is furnished with extremely large and long fangs, or poisonous teeth, two of which appear on each side of the upper jaw. The length of this animal is about thirty-five inches. Its colour is yellowish, olive-brown, very thickly sprinkled all over with minute blackish specks. Along the whole length of the back extends a series of yellowish-brown oblong spots, or marks; and on each side of the body, throughout its entire length, runs an acutely flexuous or zigzag line, or narrow ochraceous band. The belly is dull ochre colour, or cinereous yellow, marked with blackish dots, and besides these a number of black spots of various sizes are sparingly dispersed over the whole animal. The head is broad, compressed, and covered with small scales, and marked on the upper part by a longitudinal patch of brown, running out into pointed processes, and bounded by a space of dull lead colour, or cinereous. The scales on the whole of the upper part of the body are hard, stiff, and strongly carinated; the tail is somewhat thin and short in proportion to the body. The Horned-snake is supposed by Dr. Shaw to be a native of the interior of Africa.

VIPERA RUSSELII.—*Russelian Viper.*

Spec. Char.—*Body* brownish yellow, with acutely ovate blackish dorsal spots, edged with white; lateral spots smaller and ovate.

Katuka Rekula Poda; *Russel, Ind. Serp.* p. 10, t. 7.

This is a large and elegant species, measuring from four to five feet in length. It inhabits India, where it appears to be one of the most common, as well as most noxious, of the serpent tribe. Its colour is a beautiful pale yellowish-brown, marked throughout the whole length of the back with a chain or series of rhomboidal or somewhat ovate spots of a deep brown colour, paler in the centre, and surrounded by a narrow line of white. In some parts these spots are nearly confluent; on each side of the body is a row of brown oval spots, smaller than those on the back, and besides these a few still smaller transverse marks are sparingly scattered on the sides; the under part of the body is white, with a few dusky spots; the head is rather large, and covered with small ovate highly carinated scales; the snout obtuse; the mouth wide; the fangs are large, and, as in several other poisonous serpents, double; a smaller fang being situated close to the larger one on each side.

Dr. Russel informs us, this species is scarcely less commonly met with in India than the Cobra di Capello; but from its not being carried about, like that and some other snakes, as a public show, it is not so universally known either among the natives or Europeans. A stout dog bitten in the thigh by one of these snakes, was instantly infected, seized with paralysis, and expired in twenty-six minutes.

VIPERA BRACHYURA.—*Puff Adder.*

Spec. Char.—*Body* yellowish-brown, variegated with transverse angular or undulated black and whitish

bands; *head* indistinct; *tail* short. *Length* four and a half feet.

Coluber Lachesis, var.; *Shaw, Zool.* iii. t. 105; *Syst. Nat. Gmelin*, p. 1085. Vipera Inflata; *Burchel, Trav.* i. p. 469; *Seba, Thesaur.* ii. t. 30, f. 1. Cobra Lachesis; *Laurenti*, p. 104. Echidna arietans; *Merrem, Tent. Syst. Amphib.* p. 152, n. 12; *Wagler, Amph. Fasc.* 1, t. 11. Coluber Bitis; *Bonnat, Oph.* p. 22, t. 93. Coluber Hebraicus; *La Cepede, Quadr. Ov.* ii. p. 106. Vipere Hebraica; *Latreille, Rept.* iii. p. 335. Vipera Brachyura; *Cuv.*

This is a native of Africa, and is well known at the Cape by the name of the *Puff Adder*. The general colour is a dusky brown, but variegated with black and cream-coloured transverse stripes, of which it is not easy to convey an idea by mere description.

The head, which is short, round, and covered with small oval carinated scales, is not distinguished from the rest of the body by any appearance of neck, or contraction; the mouth large, wide, and armed with four large incurvated fangs, two in each jaw. The body is disproportionately short and thick, measuring seven inches in circumference in the thickest part, and from three feet six to four feet in length. The scales, which in many parts are tipped with white, are large, strongly carinated, oblong, closely imbricate, and so loose that the animal is said to have the faculty of elevating them at pleasure, or when irritated, and of closing them again with a loud rustling noise. The scales on the upper part of the body are elegantly speckled with pale yellow, cinereous grey, black, brown, pale yellow, and white. The abdominal scuta are broad, of a pale colour, and marked with numerous small irregular dusky or blackish spots. The bite of this reptile is said to be extremely fatal, taking effect so rapidly as to leave the person who has the misfortune to be bitten no chance of saving his life but by instantly cutting out the flesh surrounding the wound. "Although," says Mr. Burchell, "I have often met with this serpent, yet, happily, no opportunity occurred of witnessing the consequences of its bite; but, from the universal dread in which it is held, I have no doubt of its being one of the most venomous of Southern Africa. There is a peculiarity which renders it most dangerous, and which ought to be known by every

person liable to fall in with it. Unlike the generality of snakes, which make a spring or dart forwards when irritated, the Puff Adder, it is said, throws itself backwards; so that those who should be ignorant of this fact would place themselves in the very direction of death, while imagining that by so doing they were escaping the danger. The natives, by keeping always in front, are enabled to destroy it without much risk."

VIPERA ATROPOS.—*Deadly Viper.*

SPEC. CHAR.—*Body* whitish, with four rows of reddish-brown spots, white in their margins; four black spots on the *head*. *Length* fifteen inches.

Coluber Atropos; *Lin. Syst. Nat.* p. 275.

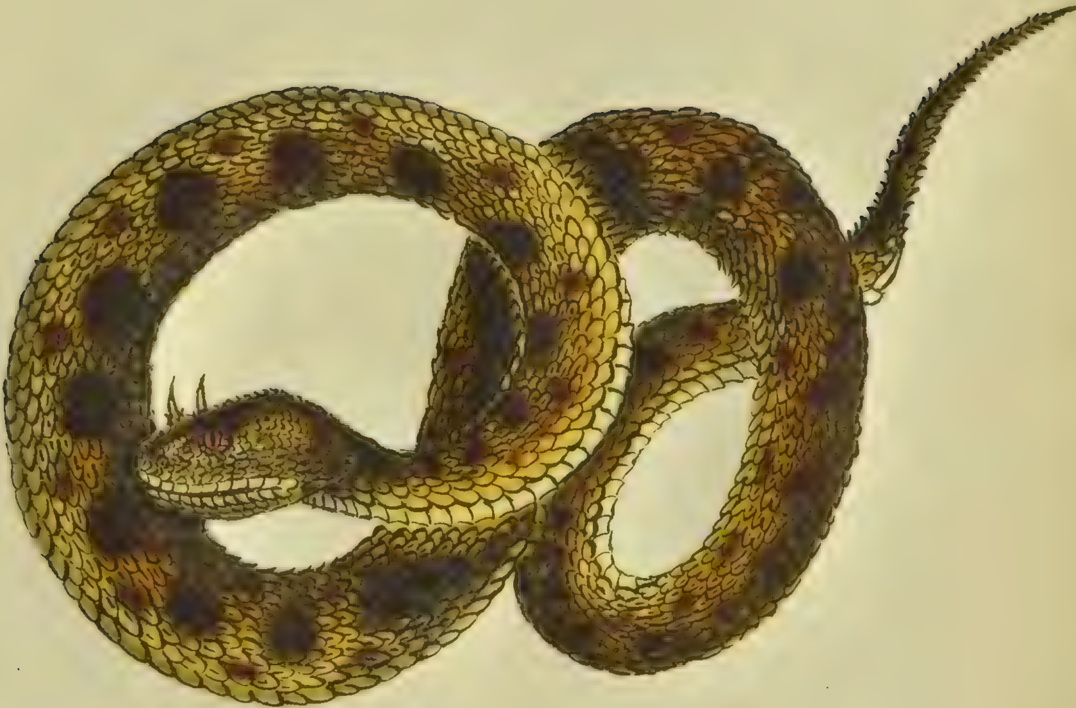
THIS is a small species, seldom exceeding fifteen inches in length, and inhabits South America, where its bite is much dreaded. The head is large and covered with small scales; the body is whitish or cinereous above, and is marked with a quadruple series of very large alternate round brown spots, by which character this species is very easily distinguished.

SCYTALE BIZONATA.

PL. XIII.

GEN. CHAR.—*Body* and *tail* below with a row of transverse plates; *poisonous fangs* in the upper jaw; no *hollows* behind the nostrils; *tail* destitute of rattles.

SPEC. CHAR.—*Body* dark brown, with a waving yellow band on each side, and a row of yellowish dorsal spots edged with black; *head* with four dark spots. *Length* fifteen inches.



Cerastes vulgaris.

London, Published by John Wilson, Princes Street, Soho, April 1.st

Scytale bizonata.

London, Published by John Wilson, Princes Street, Soho, ...

Pseudoboa fasciata.

Scytale Ziczac; *Daud.* Horrata Pam; *Russell Ind. Serp.* p. 2, t. 2. Boa Horrata; *Shaw, Zool.* iii. p. 359.

THIS serpent inhabits India. It is a small species, rarely exceeding fifteen inches in length, and is called by the natives *Horrata Pam.* Its colour is a dark brown, with a row of spots on the ridge of the back, from the neck to the extremity of the tail, varying a little in size and figure, but all of a dull yellowish colour edged with black. Along each side runs a conspicuous waving fillet of the same colour, and on the head are four remarkable dark spots, the largest of which bears some resemblance to a horse-shoe. The scuta are yellowish white, and all the abdominal ones are marked with three or four dusky spots. The head is rather small than large, depressed, obtuse, and entirely covered with very small carinated oval scales. The scales on the body are carinated, oval, and larger than those on the head. The mouth is small, and the lower jaw somewhat shorter than the upper. There are two rows of palatal teeth; but no marginal row, and the fangs are large, one on each side of the upper jaw. The eyes are lateral, orbicular, very large, and placed very forward. The trunk gradually swelling from the neck, and tapering towards the tail, which is short and pointed. The poisonous organs of this snake show it to be very noxious, but in what degree it is so has not hitherto been correctly ascertained. It is reported, however, to be one of the most fatal of serpents; and is supposed by Dr. Russel to be the *Virgen Pamboo* of the Tamools, against whose bite a double dose of the Tranjore pill is directed to be given.

XIV.

PSEUDOBOA FASCIATA,

Fasciated Pseudoboa.

GEN. CHAR.—*Plates* on the belly and under the tail single; *head* short, covered with large plates; *occiput*

a little prominent; *back* carinated, with a longitudinal row of larger scales.

SPEC. CHAR.—*Body* subtriangular, yellowish, with numerous dusky blue transverse bands. *Length* six feet.

Bungarum Pamah; *Russ. Ind. Serp.* p. 3, t. 2. Bungarus Annularis; *Daud.* Boa Fasciata; *Shaw, Zool.* iii. p. 353, t. 99.

THIS species, which may be ranked among the most formidable of the poisonous serpents, inhabits India, and is said to be not uncommon in the country of Bengal. It is a large snake, measuring six or seven feet in length, the diameter in the thickest part being nearly five inches. It is of a yellowish colour, marked with numerous dusky blue transverse bands, each band completely surrounding the body of the animal, but somewhat paler underneath. The head is small, hardly broader than the neck, ovate, depressed, and covered in front with small suborbicular scales. The occiput and middle of the head, between the eyes, is covered with ten large plates, varying in size and figure. The rostrum is obtuse or subtruncate, the mouth of moderate size, and the jaws nearly equal. The teeth in the lower jaw are numerous, reflex, very short, and almost hid in the gum; in the upper jaws the teeth in the two palatal rows are also small. The fangs, in proportion to the size of the animal, are remarkably short. The body is of a triangular form, the sides sloping very considerably; along the ridge of the back runs a continued series of larger ciliated hexagonal scales, those on the rest of the body being ovate, smooth, closely imbricate, and very adherent. The abdominal scuta are very broad, and finely ciliated on their margins. The tail is thick, five inches only in length, and its termination rather obtuse.

The bite of this reptile is regarded by the Indians as inevitably fatal. Dr. Russel, in his splendid work on Indian serpents says, that a specimen of this species was brought to him in the month of November, 1788, in an apparently weak and languid state, having been bruised in taking. Being set at liberty in a room, it crept

slowly towards an obscure corner, where a chicken being presented to him he took no notice, and even suffered the bird to stand on his back. As he shewed no disposition to bite, his jaws were forcibly opened, and the thigh of the chicken being placed between them, the mouth was closed over it so as to cause the fangs to act. The bird, when disengaged, showed immediate symptoms of poison, and after several ineffectual efforts to rise, rested with the beak on the ground, the head being seized with trembling. In the space of twenty minutes, it lay down on one side, and convulsions soon supervening, it expired within twenty-six minutes from the bite. This was the only experiment made, the snake itself dying in the course of next day."

No remedies which deserve notice against the bite of the Pseudoboa are known to the natives; in the treatment of this and similar accidents, charms and superstitious applications are generally resorted to.

PSEUDOBOA LINEATA.—*Lineated Pseudoboa.*

SPEC. CHAR. *Body* blackish blue, with white dotted transverse bands; *length* four to five feet.

Gedi Paragoodoo; *Russel, Ind. Serp.* p. 1. t. 1. Boa lineata; *Shaw, Zool.* iii. p. 356.

LIKE the preceding species, this reptile is not uncommon in many parts of India, particularly at Vizagapatam, where it is known to the natives by the names of *Gedi Paragoodoo* and *Pakta Poola.* It is of an exceeding dark blue colour, so as to appear almost black in certain lights, and is marked throughout the whole of the upper part by several transverse dotted white lines, disposed at nearly equal distances, and varying in number in different individuals from forty-two to fifty; the transverse plates which cover the under surface of the body and tail being of a yellowish white. The head is covered with large plates; the tail is about five inches and a half in length, tapering, and pointed.

By the natives of India the bite of this animal is regarded as almost immediately fatal. The experiments of Dr. Russel, however, show that it seldom proves fatal to chickens in less than half an hour, and to dogs in less than an hour and ten minutes. The poison was also observed to cause less violent convulsions in the animals subjected to its influence than that of the *Cobra di Capello*, and another highly poisonous Indian snake, called *Katuka Rekula Poda* (Vipera *Russelii*); but produced a greater degree of stupor.

XV.

NAJA VULGARIS.

Spectacled, or Hooded Snake.

Gen. Char. *Scales* larger on the body near the head; *head* covered with large plates; *hind-head* furnished with a hood; *poison fangs* in the upper jaw.

Spec. Char. *Body* ferruginous yellow; *neck* capable of inflation, and marked above by white delineations, with black edges, in the form of spectacles.

Serpens Indicus coronatus; *Raii, Syn. Serp.* p. 330. Serpens Naja Siamensis, cum conspicillo, seu Cobra de Capello vel Cabelo dictus; *Seba. Thes.* ii. t. 89. f. 1. Serpens Indicus coronatus, &c. *Seba*, ii. t. 90, f. 2. Coluber Naja; *Lin. Syst. Nat.* p. 382; *Shaw, Zool.* iii. p. 409. t. 107. Naja lutescens; *Laurenti, Syn. Rep.* p. 91. Nagoo; *Russel, Ind. Serp.* p. 7. t. 5 and 6. La Vipere à lunettes, ou le Naja; *Daud. Rept.* vi. p. 62, t. 60, f. 1, 2, and t. 71.

The *Cobra di Capello*, or Hooded Snake, is a native of India, where it appears to be one of the most common, and most noxious, of those malignant reptiles, whose bite, in the hotter regions of the globe, proves the cause of a painful and speedy death. Among the serpents of the East this species holds the most conspicuous place; it is generally regarded of all others

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Naja Vulgaris.

London Published by John Wilson, Princes Street, Soho, April 21st 1831

the most deadly, very frequently proving fatal, in the space of a few minutes, to those who unfortunately experience its bite. Its remarkable dilineations, and the occasional expansion of the skin of the neck in the form of a hood, enables the most superficial observer to readily distinguish it from every other species of the ophidian tribe. The natives of India pretend to enumerate a great number of varieties, to which they ascribe different degrees of malignity; but on a careful examination of a great number of individuals, Dr. Russel found the venomous property nearly equal in all. Its usual length is from four to six feet, and the diameter of the body about an inch and a quarter; but it sometimes attains much larger dimensions. A specimen was lately shewn me, by a dealer in curiosities in Princes Street, Soho, which measured seven feet four inches from the tip of the muzzle to the extremity of the tail. The head is comparatively rather small, broad, ovate, obtuse, depressed on the crown, and covered with large smooth plates. The scales on the neck and sides of the head, and also on the back, are smaller, ovate, polished, contiguous, hardly—except on the hinder part and tail—contiguous, in the living subject; but two rows on each side of the belly consist of larger scales, ovate and imbricate. The mouth is large; the lower jaw somewhat shorter than the upper. The teeth, according to Dr. Russel, are few in the lower jaw, sharp, reflex, at regular distances, except in front, where two or three appear closer set and longer. In the upper jaw, as usual in venomous snakes, there is no marginal row; only two palatal rows of teeth; these are numerous, reflex, equal, sharp, and smaller than those below. Two fangs, one longer than the other, are generally found emerging from the poison gland on each side of the upper jaw. The eyes are rather small, orbicular and prominent. The nostrils are very near the rostrum, lateral, large, and gaping. The neck, when the animal is at rest, is very little larger than the head; but at a little distance beyond that part, is a natural swelling or dilitation of the skin, which is continued to the distance of about four inches downwards, where the outline gradually sinks into the outline of the rest of the body. This part is dilatible at the pleasure of the animal; and when viewed from above, in its most extended state, is somewhat of a cordate form,

and marked with a singular spectacle-formed spot, of black and white. This spectacle-like mark, or hood, is more or less distinct in different individuals, varying in size and form, and in some individuals is altogether wanting. It is partly formed by the colour of the intersticial skin, discovered in consequence of the separation of the scales; but the tint of the scales also contributes to produce this figure, especially in regard to the dark colours. The general colour of the animal is a pale ferruginous brown, but in certain positions the glistening scales reflect a faint blueish ash colour. The tail is round, measuring about nine inches in length, covered with suborbicular scales, and tapers gradually to a sharp horny point. The abdominal scuta are very long; the subcaudal squamæ hexagonal; both are of a dull blueish white, sometimes slightly tinged with pale brown or yellow.—Fig. 1. represents the head of the Naja *vulgaris,* exhibiting the poison fangs; 2. the palatal row of teeth; 3. a poison fang a little magnified, showing the lateral fold or tube for the conveyance of the poison; and fig. 4. a section of the same tooth near the base.

The title of Cobra di Capello, or Hooded-snake, has been given to this formidable reptile by the Portuguese from the appearance which it presents when viewed in front in an irritated state, or when preparing to bite, at which time it bends the head rather downwards, and seems hooded, as it were, in some degree, by the expanded skin of the neck. It is called by the Hindoos, *nagoo,* and by the English, Cobra di Capello, or spectacled-snake.

The Hooded-snake varies considerably in size and colour. Laurenti enumerates four varieties: *Naja lutescens,* the common kind; β *Naja fasciata fasciis per totum corpus ex fusco rubris,* having fuscous red bands over the whole body; γ *Naja siamensis excinereo grisea, summo dorso rufo.* Cinereous with the back rufous; and δ *Naja maculata ex luteo rufa, squamis singulis alba macula notatis*; of a tawny yellow colour, and having each scale marked with a single white spot. But it appears from the work of Dr. Russel on Indian Serpents, that there are many other varieties of this extraordinary snake. He describes no less than ten different kinds that are found in India alone, and seems to intimate that these are not the

whole of the Nagoo tribe which infest that part of the world. It is possible, on further investigation, some of those described by Dr. Russel as varieties may prove to be specifically distinct.

Of the Cobra ten varieties are enumerated by Dr. Russel, to which names are given in the Telinga language :

1. *Aregee Nagoo.* With a pale central spot in the middle of each of the black spots of the spectacle-shaped mark. Abdominal scuta 198, subcaudal scales 60.

2. *Coodoon Nagoo.* This variety is darker than the other and the skin is of a yellower cast ; but the principle distinction is in the spectacle mark, which consists of an oblong curved fissure without the usual black eyes or centre spots of the others.

3. *Sankoo Nagoo.* Having a plain hood without any mark ; more rare than the other varieties. Abdominal scuta 183 ; subcaudal scales 56.

4. *Molga Nagoo.* Having the cervical scuta marked with faint greyish spots, and four of the middle ones entirely of a blueish grey. Abdominal scuta 192 ; subcaudal scales 65.

5. *Malle Nagoo.* The colour of this variety is of a lighter brown than the rest, and the scuta whiter and less spotted. Abdominal scuta 191 ; subcaudal scales 62.

6. *Cumbo Nagoo.* In this all the cervical scuta were dusky, and the trunk had a strong blueish cast. Abdominal scuta 186 ; subcaudal squamæ 60.

7. *Jonna Nagoo.* Having the skin tinged with orange colour and the scuta of the neck spotted with grey. Abdominal scuta 189 ; subcaudal squamæ 57.

8. *Nella tas pam.* With the black on the hood unusually deep, and all the jugular scuta remarkably dusky. Abdominal scuta 186; subcaudal squamæ 62.

9. *Kistna Nagoo.* The middle lamina of the three between the eyes remarkably broad, and the posterior part sub-ovate, instead of semi-caudate ; five of the jugular scuta dusky, and six of the pectoral almost black. Abdominal scuta 186 ; subcaudal squamæ 63.

10. *Korie Nagoo.* The three laminæ between the eyes remarkably narrow ; the large posterior pair oval, the colour of the trunk,

and still more of the scuta unusually blueish. Abdominal scuta 184; subcaudal squamæ 57.

The Cobra di Capello, it is observed, is everywhere exhibited publicly as a show in India. It is carried about in a covered basket, and so managed by its proprietors as to assume a kind of dancing motion; raising itself upon its lower part, and alternately moving its head and body from side to side for some minutes to the sound of some musical instrument which is played during the time. The Indian jugglers, who thus exhibit the animal, first deprive it of its fangs, which renders it incapable of inflicting a poisonous wound by means of its bite.

Dr. Russel, in his account of various experiments made in India with this serpent, assures us that as a general standard for the comparison of the effects of its bite with that of other poisonous serpents, he never knew it prove mortal to a dog in less than twenty-seven minutes, and to a chicken in less than half a minute. Thus, fatal as it is, its poison seems not so speedy in its operation as that of the Rattle-snake, which has been known to kill a dog in less than two minutes. The following interesting observations are related by Dr. Russel to confirm the accuracy of this observation.

In the month of June 1787, a dog bitten by a Cobra di Capello on the inside of the thigh, howled at first, as if in severe pain; after two or three minutes he lay down, continuing to howl and moan; after 20 minutes he rose, but with much difficulty, being unable to walk, and his whole frame appeared greatly disordered. He soon lay down again, and in a few minutes was seized with convulsions, in which he expired 27 minutes after. This is the only instance mentioned in which the poisonous bite of the Cobra di Capello proved fatal to dogs in much less than the space of an hour.—A large and very stout dog was bitten by another Cobra di Capello on the inside of the thigh, which in a minute or two was drawn up, the first symptom in general of the poison having taken effect. He continued, however, nearly half an hour longer walking on the three remaining legs, seeming not otherwise disordered; but after this time he laid himself along in great inquietude, his head and throat being convulsed in an uncommon degree; he made

several vain efforts to rise, his legs became paralytic, and after continuing in this state for an hour he expired.—A large dog was bitten by a Cobra di Capello, which had been captive only two days. He complained a good deal at the instant of the bite, and the leg was soon drawn up. In twenty-five minutes he was seized with convulsions, succeeded by stupor, in which he lay for ten minutes; the convulsions, however, returned, and he expired in a quarter of an hour, being fifty-six minutes after the bite. Dr. Russel endeavoured also to ascertain the effect of the bite of the Cobra di Capello upon reptiles of the same species, the result of which appears doubtful. In some instances the bitten animal experienced no kind of injury, while to others the bite proved fatal.

The poison, as in all the species of this order, is a semi-transparent yellowish fluid, resembling olive oil. The symptoms appear to be in all respects the same as follow from that of the Rattle-snake, already detailed, and terminates in most cases in death.

The treatment to be adopted for the bite of the Cobra di Capello must be pretty similar to that which has been advised for the bite of the Rattle-snake and the vipers; viz. preventing the absorption of the poison into the system, employing powerful diaphoretics and stimulants at the same time, to counteract or alleviate the effects that arise from it. In India the Tanjore pill, the basis of which is arsenic, has been long celebrated for the cure of the bite of the Naja and other venomous serpents. These pills are said to consist of arsenic combined with pepper, mercury, and the juice of the Asclepias *gigantea*. Van Rheede, in his Hortus Malabaricus, mentions the nux vomica as a preventive of the effects of the bite of the Naja. Kœmpfer highly extols the root of the Ophiorrhiza *Mungos*, and in Ceylon it is still employed as an antidote against the bite of the mad dog.

NAJA HAJE.—*The Hajè, Asp, or Aspic.*

Spec. Char. *Body* olive-brown, variegated with white; *abdomen* whitish, with blackish spots; *neck* capable of inflation; *length* five to six feet.

Le Vipere Haje; *Daudin, Rept.* vi. p. 41. L'Aspic; *Geoffroy, Rept. Egypt.* suppl. t. 3.

This species, which has attained more than ordinary celebrity from being supposed to be the animal whose poison the famous Cleopatra selected to terminate her existence, is found abundantly in Lower Egypt, sometimes in hedges, and sometimes in the fields. "It is universally known," says Mr. Griffiths, "that this illustrious princess, abandoned by fortune, who had so long smiled upon her, commanded that a reptile of this species should be brought to her concealed in fruits and flowers, and caused it to bite her, to put a period to her misfortunes. But after the fall of the Roman empire, though Egypt still preserved some traces of the high renown of Cleopatra, and though the name of the Aspic was not pronounced without some degree of horror by all the people of Europe, still for a long series of ages the true species of the serpent was unknown, and the Cerastes, the Egyptian Viper, the Ammodytes,* and the Lebetina, were taken for it. Bruce declared for the first of these opinions, Forskal for the last, and Laurenti, Hasselquist, Daudin, and Count La Cépède, for the second, which undoubtedly has some plausibility, for it is well proved that under the name of *αςπις*, the ancients were acquainted with many venomous serpents aboriginal of Egypt.

"It has been only since the expedition of the French to Egypt that the true species of the Aspic has been ascertained. During the period of that expedition, the French philosophers attached to the army observed a species of ophidian, regarded as harmless by Linneus and most herpetologists, but considered as extremely venomous by the traveller Forskal. This ophidian is called *hajé* by the inhabitants, and recent travellers have incontestibly proved that it is the true aspic of the ancients, which never inhabited Europe; for the reptile which some years since infested the forest of Fontainbleau, and was called by this name, was nothing but a

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* The Coluber Ammodytes, *Jacq. Coll.* iv. t. 24, 25, a species greatly allied to the Viper, from which it is distinguished by an erect process or wart at the tip of the muzzle. It is an extremely poisonous reptile, and inhabits the mountainous parts of Illyria.

variety of the common viper; and the *Œsping* of the Swedes, is quite another species from the one in question."*

The ancients entertained a notion that the poison of this serpent is more deadly than that of any other venomous creature inhabiting the East; that its bite, though inevitably mortal, produced no pain or violent symptoms, and merely occasioned the gradual diminution of pulsation, which was followed within twenty-four hours by a profound sleep terminating in death. Galen assures us, that in Alexandria, to shorten the punishment of criminals condemned to death, they were bitten in the breast by an Asp; and Dioscorides asserts that the wounds occasioned by the bite of this reptile are unaccompanied by any local tumefaction, and that they are so small that they appear to have been made with a very fine needle.

XVI.

ACANTHOPHIS BROWNII.

Brown's Acanthophis.

GEN. CHAR. *Shields* double towards the extremity of the tail, which terminates in a spinous process; *head* covered on the anterior part with large plates; *hind-head* tumid, with small scales similar to those on the back; no hollows behind the nostrils; *poisonous fangs* in the upper jaw.

SPEC. CHAR. *Body* blackish; *under lip* whitish; a tranverse groove before the *nostrils; tail* short, with the apex laterally compressed.

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* *The Animal Kingdom, described and arranged in conformity with its organization, by* Baron Cuvier, *with additional descriptions by* Edward Griffith, *F. L. S.* vol. ix. p. 382.

Acanthophis Brownii; *Leach, Zool. Miscel.* i. t. 3.

This species is a native of New Holland, and was first noticed at Port Jackson, by Robert Brown, Esq., F. R, S., who described it in his MSS. under the title of *Boa ambigua.* Dr. Leach, who figured it in his "Zoological Miscellany," named it after him, as a tribute justly due to his talents, not only as one of the first botanists of the age, but also as a gentleman zealous for the promotion of every branch of natural history. The upper part of the body is of dark brown or blackish colour; it is paler or ferruginous beneath. The plates covering the anterior part of the head are large; the occiput is tumid, and covered with numerous small carinated scales, similar to those on the back. The subcaudal squamæ are double towards the extremity of the tail, which is short, and terminates in a spinous process. The head and tail are represented of the natural size, which will convey an accurate idea of the magnitude of the whole animal. There are poisonous fangs in the upper jaw, and the natives suppose it to be the most venomous snake found in New Holland.

ACANTHOPHIS PALPEBROSUS.

Palpebral Acanthophis.

Spec. Char. *Body* pale grey, with blueish transverse bands on the back; reddish with two rows of black points below; *orbits* very prominent.

Acanthophis cerastinus; *Daudin, Rept.* v. t. 59, f. 10, 11, and t. 67, f. 1, 2.
Schlingende natter, (couleuvre boa); *Merrem, Beytræge sur gesch. der Amph. fasc.* 2, p. 20, t. 3.

First described and figured by Merrem; but the native country appears to be unknown. Length about fifteen inches; head rather large, slightly compressed, and covered in front with large scales; the rostrum obtuse and rounded; eyebrows very promi-

nent; the eyes small, round, and surrounded by five small plates; upper parts of the body, neck, and tail, covered with small hexagonal scales; general colour above, pearly grey, with obscure, transverse, dusky, or bluish undulations; beneath pale yellowish or reddish brown, with a small black spot at the edge of each abdominal scutum, and a similar range of spots from the anus to the end of the tail, the extremity of which, for about the length of half an inch, is furnished with divided scales. This species is generally supposed to be poisonous. Daudin observes, "son analogie avec le ceraste et la vipere cornue de Paterson (*Vipera lophophris*, Cuv.) semblent d'ailleurs indiquer qu'il est dangereux."

ELAPS LEMNISCATUS.

Riband-like Elaps.

Pl. XVI.

GEN. CHAR. *Head* behind same breadth as the neck, with large plates; *neck* not dilatable; *dorsal scales* equal; *tail* conical, moderate; *sub-caudal plates* two rowed.

SPEC. CHAR. *Body* slender, cylindrical, yellowish, white, or rose-coloured, with annular bands or zones of black disposed in pairs; *head* rather flat, with a black band in front across the eyes.

Cobuber lemniscatus; *Syst. Nat. Gmelin*, p. 1110; *Mus. Ad. Fred.* p. 34, t. 14, f. 1. Natrix lemniscata; *Laurenti, Syst. Rept.* p. 76, n. 152; *Seba Thes.* i. t. 10, fig. ult. ii. t. 76, f. 3. La Galonee; *La Cepede, Rept.* in 18mo. iv. p. 104. La Vipere galonnee; *Daudin, Rept.* vi. p. 13. Elaps lemniscatus; *Schneider, Hist. Amph. fasc.* 2, p. 291.

MUCH diversity of opinion prevails among naturalists respecting the poisonous qualities of the species belonging to the genus Elaps.

By Wagler this genus has been removed from among the poisonous serpents, with which it had been associated by Daudin, Cuvier, and Merrem, and placed among the innocuous of the family Ophidii Colubrini, inasmuch as on a careful examination of numerous individuals he discovered that they were entirely destitute of poisonous fangs. E. Langsdorfii, however, is furnished with one larger tooth in the upper jaw, and the species here represented, which was drawn from a specimen in the collection of Mr. Bell, and obtained by him from Berbice, has generally been regarded as extremely poisonous. This elegant species grows to the length of about two feet. It is of a beautiful pale yellow rose-colour, marked throughout the whole length, by annular bands of a deep brown or black, entirely surrounding the body, and each separated from the next adjoining one by a narrow white stripe, or line of the ground colour. The head is small, rather flat, covered with large plates, and marked by a blackish transverse band in front across the eyes, and a similar band over the occiput; the rostrum is obtuse, and the opening of the mouth rather small. The body is cylindrical, of the thickness of a swan's quill, and covered with smooth, shining, rhomboidal scales; the tail is short and gradually tapers to the tip. This species varies considerably in the colour of its zones; in some individuals they are tinged with a rich crimson hue; in a specimen figured by Seba, they are purple.

According to Daudin, the Elaps *lemniscatus* is indiginous to Guiana and Surinam, where it is much dreaded, and has occasioned the *tortrix scytale*, and the black banded coluber to be also objects of terror, in consequence of the similarity of their forms and colour, although the latter reptiles are perfectly harmless. It is probably the serpent called *oroucoucou* by the negroes of Surinam, whose poison is very active. Stedman relates that a slave having been bitten in the foot by one of these animals, in less than a minute his leg began to swell, he experienced the most excruciating pain, convulsions came on, and he expired soon afterwards. The same traveller remarks, that in general, at least in Guiana, the smaller the snake the more fatal is the poison, as is beautifully observed by Thompson:

> " ———————— But still more direful he,
> The small close-lurking minister of fate,
> Whose high concocted venom through the veins
> A rapid lightning darts, arresting swift
> The vital current."

Stedman supposes that this Elaps is the same animal as the small *labarra* mentioned by Dr. Bancroft, in his History of Guiana, who assures us, that the violence of the poison is so great that it causes death in less than five minutes, accompanied by a discharge of blood through all the natural apertures of the body. The gall of this serpent is used by the natives both internally and externally, as aspecific against its bite.*

ELAPS LACTEUS.—*Milky Elaps.*

SPEC. CHAR. *Body* white, marked by double black spots; *head* black, with a longitudinal white line; *length* eighteen inches.

Coluber lacteus; *Lin. Mus. Adolph.* t. 17, f. 1; *Seba, Thes.* ii. t. 35, f. 2, t. 54, f. 1.

A NATIVE of India and South America; and is reputed poisonous. The head is ovate, black above, and marked with a longitudinal white line; body cylindrical, white, marked with double black confluent spots; abdomen livid or brownish; tail short and tapering.

ELAPS LANGSDORFII.—*Langsdorff's Elaps.*

SPEC. CHAR. *Body* black, with minute yellowish oblong, transverse spots; *abdomen* yellow, with broad red bands; *length* two feet four inches.

E. Langsdorfii; *Spix et Wagler, Serp. Bras.* p. 10, t. 2, f. 1.

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* *Narrative of an Expedition to Surinam,* ii. p. 133.

DISCOVERED by Dr. Spix, on the banks of the river Japura, in Brasil.

ELAPS MICRURUS.—*Spix's Elaps.*

SPEC. CHAR. *Body* pale fawn colour, with equidistant broad black bands; *scales* tipped with dark brown; *length* three feet eight inches.

Micrurus Spixii; *Spix et Wagler, Serp. Bras.* p. 48, t. 18.

INHABITS Brasil.

XVII.

COPHIAS LANCEOLATUS,

Spear-headed Cophias, or Yellow Viper of Martinico.

GEN. CHAR.—*Head* widened behind, in some cases covered with scales similar to those on the back, in others shielded; *sub-caudal plates* double; a depression behind the nostrils; *poison-fangs* in the upper jaw; *tail* generally terminating in a spinous process.

SPEC. CHAR.—*Body* yellow variegated with brown; *head* flat, cordate, with a large plate above each eye; a large orifice on each side between the eyes and nostrils.

Coluber Megæra; *Shaw, Zool.* iii. p. 406. La Vipere *Fer-de-Lance; La Cepede, Hist. Nat. des Rept.* ii. p. 121, t. 5, f. 1; *Daudin, Rept.* vi. p. 28, t. 60, f. 19. Trigonocephalus lanceolatus; *Cuv.*

THIS animal, after the enormous Boa, the Python, and the Anaconda, is one of the largest of the Ophidian order, being not unfrequently

Engelmann lith.

Cophias lanceolatus.

London: Published by John Wilson; May 1, 1831.

from six to eight feet in length. It inhabits Martinico, St. Lucia, Dominica, and some other West India Islands. According to La Cepede it is also found at Cayenne, in South America, and, next to the Rattle-snake, may justly be regarded as the most dangerous of the trans-atlantic serpents. A specimen of this snake preserved in the British Museum, from which the accompanying figure was made, measured something more than five feet; the tail measures eight inches, and gradually tapers to the extremity. The body is of a pale brown colour, and marked throughout the whole length of the animal by pretty numerous irregular bars or variegations of a rich brown or ferruginous tint, with irregular patches of the same colour and of dull yellow along the sides, and still more obscure markings on the part nearest the scuta; the abdomen is dirty yellow, sometimes clouded and speckled on the sides with pale brown; the head is large, flat, cordate or subtriangular, and covered with small carinated scales; but the terminal scales of the nose and those at the sides of the mouth are very large; above each eye also is a very large scale; the nostrils are small, and between them and the eyes on each side is a large orifice the use of which has not been hitherto clearly ascertained. The scales on the upper part of the body are moderately large, ovate, and carinated; the back somewhat convex, the sides rather sloping, and the abdomen flattish. The fangs are very large, measuring near three quarters of an inch in length, and curved. The poison, as in all the species of the family, is a clear yellowish fluid, resembling olive oil. The number of abdominal scuta in the specimen described by La Cepede was 228, and that of the subcaudal squamæ 61 pair; in the British Museum specimen the number of the former is 224, and of the latter 68.

The name of *Fer-de-lance* was given to this serpent by the Count La Cepede, from a fancied resemblance between the shape of the flat sub-triangular space on the middle of the head and that of a spear-head or halbert.

The fertility of this noxious reptile is very remarkable: the female goes six months with young, and brings forth from forty to sixty young ones at a birth. At the moment of their birth the young ones are completely formed, of various colours, some being

yellow, others grey, and others variegated with yellow, grey, and brown; they are extremely active, ready to bite, and six or eight inches in length.

Fortunately for mankind, the habitat of this animal is very much circumscribed. "It does not extend throughout the entire of the Archipelago of the Antilles, nor is it found even in the majority of those Islands which constitute that archipelago. By a chance equally singular, fortunate, and inexplicable, it is confined to the Islands of Martinique, St. Lucia, and Beconia alone; and there is no proof that, as has been pretended, it is common in the American continent. Nevertheless, a tradition exists among the Indigenes that it was introduced into Martinique by the Arronages, a horde which inhabited near the Orinoco, and who, impelled by sentiments of hatred and vengeance against the Caribs of that island, made them this fatal present, and let loose in their forests this serpent, which was brought over in calabashes. But according to another popular opinion in the same country, the Trigonocephalus, (Cophias *lanceolatus*) is aboriginal to Martinico, it cannot live elsewhere, not even in Guadaloupe. Some, however, think differently, and explain the phenomenon by the existence of the dog-headed serpent, which is believed to be a Boa, and which, common in Dominica and St. Vincent, has delivered those islands from the Trigonocephalus. Be all this as it may, it is very certain that this species is greatly multiplied, at the present day, in St. Lucia and Martinique, where a field of sugar-canes is never cut without sixty or eighty of these serpents being found. They people the marshes, the tilled grounds, the forests, the borders of rivers, and the mountains, from the level of the sea to the region of the clouds. They may be seen creeping in the mud, struggling against the currents of the rushing streams, which would hurry them to the sea, and balancing themselves on the branches of forest trees, more than one hundred feet above the ground. On the edge of the crater of the naked mountain which overhangs the town of St. Pierre, in Martinique, at a height of more than five thousand feet, M. Moreau de Jonnes, and his companions encountered a Trigonocephalus, the more to be feared as an excessive lassitude, the consequence of their arduous exertions,

had then completely overcome them. Eight days before, at the foot of this same mountain, a fisherman, shooting with his canoe over the volcanic pebbles of the shore, was attacked by a similar reptile concealed among the basalts, and no effort could save his life."*

The serpents of which we are speaking are seldom found in the towns; but they frequently approach them, particularly in the night; and in the country they frequently penetrate into the interior of the houses, when they are surrounded by bushy and high grass; and they are said to prefer the cottages of the negroes. But it is particularly in the plantations of sugar-canes that these reptiles find an asylum, concealing themselves under the long decayed leaves with which the earth is covered, and feeding on lizards, small birds, and especially on rats, with which the plantations abound. They are also attracted by poultry-yards and aviaries; they frequently lie in ambush in the parasitic plants, which surround the fallen trunks of trees, or remain covered up in the nests of birds whose eggs or young they have devoured.

"These reptiles," continues the able translator of Cuvier, to whose work I am indebted for much interesting information on this class of animals, "possesses an activity and vivacity of motion truly alarming. A ferocious instinct induces them to dart impetuously upon passengers, either by suddenly letting go the sort of spring which their body forms, rolled in concentric and superpoised circles, and thus shooting like an arrow from the bow of a vigorous archer, or pursuing them by a series of rapid and multiplied leaps, or climbing up trees after them, or even threatening them in a vertical position.

"The effects of the bite of these serpents are in general very terrible, but vary considerably, according to a multitude of circumstances. The tumefaction of the part, which soon becomes livid and gangrenous, nausea, convulsions, cardialgia, and an invincible somnolency, are the ordinary symptoms of the action of their poison, which either produce death in the course of some hours, or at most some days, or causes for several years vertigos, paralysis, more or less

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* See *Monographie du Trigonocephale des Antilles, ou Grand Vipère Fer-de-Lance de la Martinique, par* A. Moreau de Jonnes, 8vo. Paris, 1816.

extensive, phagedenic ulcers of a malignant character, and a variety of other distressing infirmities. It is therefore nowise astonishing that the Trigonocephalus is an object of horror, not only to man but also to animals. The horse trembles and prances violently in its presence; rats scud away at its approach, sending forth cries of terror; birds especially, against which it wages inveterate war, manifest their aversion to it by repeated clamours; and the Loxia *indicator*, by pursuing with its cries, often indicates to man the place of its retreat.

"The African races, which form a great portion of the population of Martinique, constantly preserve certain organs of this reptile for talismans, either preservative or hurtful. These are called in the Carib language, *piailles*, and they are always found among the materials of those magical conjurations undertaken by the negroes who are addicted to sortilege.

"The severity of the accident produced by the bite of the Trigonocephalus varies, as in the case of other venomous serpents, according to the state of health of the bitten subject, the depth and number of the wounds, the time which has elapsed since the animal made use of its fangs, and, consequently, the quantity of poison which had penetrated into the system. But in all possible cases the help of art is indispensible. Unfortunately, to the present moment, the mode of treatment has been based on custom and empiricism of the blindest kind; and the prodigious number of remedies vaunted and recommended in their turn, only proves the uncertainty and insufficiency of the means resorted to. Fortunately, in the origin of the colony, recourse was had to scarification, and the application of cupping-glasses, which are still extolled by some practitioners as efficatious against the bite of the viper. The wound was then covered with a cataplasm of theriaca, and that electuary was administered internally. In default of this, they used to pound the head of the animal, and apply it topically upon the wound. A powder made with the hearts and spleens of serpents dried, was also long in use. Embrocations of hot oil have likewise had their partisans, and applications of pounded green tobacco leaves, and several other plants. The remedies used in Europe against the bite of the viper have also been employed,

such as the Eau de luce, liquid ammonia, opium, and arsenical preparations."

In the *post-mortem* examination of such persons as have died some time after the accident, Dr. Renzger, a German physician, whose experience on these subjects has been considerable, always found the brain and spinal chord partially softened, and a considerable effusion of bloody serum in the cavities of the skull, thorax, and abdomen; the lungs and liver were gorged with blood, and as well as the intestinal canal, exhibited gangrenous spots; the cellular tissue round the wound was sloughy, and, on incision, a great quantity of decomposed blood and sanies escaped from it.

In those cases which do not end fatally the wound becomes inflamed and erysipelatous, the general symptoms gradually disappear, and the disease altogether ceases within from three to eight weeks, under general perspiration and bilious diarrhœa. Sometimes, however, great debility and cachectic appearances remain, and death ensues, after two or three years, under paralysis, mental derangement, or dropsical symptoms. In case of ultimate recovery, the healing of the wound always takes place very slowly; the skin and neighbouring cellular tissue slough, and discharge a great quantity of blood; the margins of the wounds are of a livid colour, and bleed on the least touch; after some time, the sloughs having come away, suppuration begins to take place, but is always of an unhealthy kind; cicatrization hardly ever takes place before some months, or even years; the cicatrix is thin, of a livid colour, and liable to be inflamed or absorbed.

The best method of treatment consists in the excision of the wounded part, and its subsequent scarification and cauterization. If the necessary instruments are not at hand, the wound must be sucked and repeatedly washed with water, lemon-juice, or brandy, as in other cases of poisonous wounds; at the same time it is advisable to put a tight bandage round the limb. Stimulants must be given internally, and the wound is continually, even after the remission of the general symptoms, to be treated with stimulants and antiseptics, otherwise it will become gangrenous. In India, it appears the Tanjore pill, of which arsenic is the chief ingredient, has been exhibited with considerable success against the bites of

venomous serpents. In the second volume of the Medico-Chirurgical Transactions, there is a series of cases related by Mr. Ireland, surgeon of the 60th regiment, where arsenic was administered in very *large* doses with good effects. Mr. Ireland, on his arrival in the island of St. Lucia, was informed that an officer and several men belonging to the 68th regiment, had died from the bites of the Fer-de-lance, and that every thing had been tried by the medical men, to no purpose, he was determined to give arsenic a full trial. In these cases he exhibited two drachms of Fowler's solution with ten drops of laudanum, in the effervescing draught, and repeated it every three or four hours. Externally, the parts were frequently fomented with warm water, and rubbed with a liniment composed of oil of turpentine, liquid ammonia, and olive oil.

COPHIAS VIRIDIS.—*Green Cophias.*

Spec. Char. *Body* green, with a narrow yellowish line on each side; *head* covered with scales similar to those on the back; *length* two feet six inches.

Coluber gramineus; *Shaw, Zool.* iii. p. 420. Trimesurus Viridis; *La Cepede, Ann. Mus.* iv. t. 56, f. 2. Bodroo Pam; *Russel Ind. Serp.* p. 13, t. 9.

It is to Dr. Russel that we owe our knowledge of this remarkable species, which is a native of India, and was sent to him from Vizagapatam, in October, 1788. It is of a grass-green colour, with a narrow yellowish line on each side, and is furnished with remarkably long and slender fangs. The abdominal scuta are of a pale straw colour, and some of them have a small green spot on each side. The long slender fangs, exposed on opening the mouth, seem to indicate its being highly noxious; the person who brought it to Dr. Russel affirmed that its power of killing extended only to the smaller animals, not to dogs or sheep; and that to man, its bite caused various disorders, but never death.

COPHIAS ATROX.—*Fierce Cophias.*

SPEC. CHAR. *Body* grey brown, with transverse whitish stripes; *abdomen* dusky, with white transverse variegations.

Coluber Atrox; *Shaw, Zool.* iii. p. 429. *Lin. Syst.* p. 388. *Mus. Ad. Fred.* p. 33, t. 22, f. 2.

LENGTH about eighteen inches; it is a poisonous snake, and is said to inhabit Ceylon.

COPHIAS MEGÆRA.—*The Megæra.*

SPEC. CHAR. *Body* above brownish-green, with obscure bands margined with black; *abdomen* yellow, without spots; *length* three feet.

Bothrops Megæra; *Spix et Wagler, Serp. Bras.* p. 50, t. 19.

FOUND by Dr. Spix in the province of Bahia, in Brazil.

COPHIAS FURIA.—*Fiend Cophias.*

SPEC. CHAR. *Body* dull brown; *abdomen* yellowish, sometimes marked with blackish spots; *length* three feet.

Bothrops furia; *Spix et Wagler, Serp. Bras.* p. 52, t. 20.

INHABITS the banks of the river Amazon, in South America; feeding on insects, birds, and the smaller quadrupeds.

COPHIAS LEUCOSTIGMA.—*White-spotted Cophias.*

Spec. Char. *Body* brown, with broad obscure bands; *abdomen* cinereous; *sides* marked with whitish spots; tip of the *tail* pale ochraceous.

Bothrops leucostigma; *Spix et Wagler, Serp. Bras.* p. 53, t. 21, f. 1.

A small species, found in Brazil.

COPHIAS NEUWIEDII.—*Neuwied's Cophias.*

Spec. Char. *Body* pale brown, with large dark brown dorsal spots bordered with dirty yellow; *abdomen* yellow, clouded with black; *length* two feet.

Bothrops Neuwiedii; *Spix et Wagler, Serp. Bras.* p. 56, t. 22, f. 1.

This species, which has received its trivial name in honour of the enterprising and distinguished traveller, Prince Maximilian of Neuwied, is a native of Brazil. Its bite is considered extremely dangerous.

COPHIAS LEUCURUS.—*White-tailed Cophias.*

Spec. Char. *Body* brownish ash-coloured, with black transverse spots or bands; *trunk* and *sides* spotted with black; *abdomen* whitish; *tail* white; *length* eleven inches.

Bothrops leucurus; *Spix et Wagler, Serp. Bras.* p. 57, t. 22, f 2.

Inhabits the province of Bahia, in Brazil. It is found in woods in mountainous situations, concealing itself under the trunks of fallen trees. Its bite is considered fatal.

COPHIAS TÆNIATUS.—*Fillet-like Cophias.*

Spec. Char. *Body* above pale green, with a double series of obscure dorsal transverse spots; below ash-coloured, with whitish irregular ocellated dots.

Bothrops tæniatus; *Spix et Wagler, Serp. Bras.* p. 35, t. 21, f. 3.

A very rare species, found on the banks of the river Amazon, in South America. Length about one foot three inches.

COPHIAS TESSELLATUS.—*Tesselated Cophias.*

Spec. Char. *Body* above brown with obscure spots; a reddish brown stria behind the *eyes; abdomen* whitish, tessellated with blackish brown.

Bothrops tessellatus; *Spix et Wagler, Serp. Bras.* p. 54, t. 21, f. 2.

Length about two feet three inches. Inhabits Brazil.

COPHIAS TRIGONOCEPHALUS.

Triangular-headed Cophias.

Spec. Char. *Body* greenish, with a dorsal chain of spots of different shades; *abdomen* dusky, edged with white.

Vipera trigonocephala; *Daudin, Rept.* vi. p. 165. La Vipere la tete triangulaire; *La Cepede, Serp.* ii. p. 132, t. 5, f. 2.

Resembles the common viper in external appearance and size, but the head is larger and of a more triangular form. The body is greenish, with a row of spots of different shades uniting so as to form a regular band down the back. It inhabits the Isle of St. Eustachia.

COPHIAS RUSSELII.—*Russell's Cophias.*

Spec. Char. *Body* pale brown, with cinereous and brown oval spots on the back and sides; *head* dark brown, with a cinereous streak from each orbit; *abdomen* yellowish, dotted.

Russel, Ind. Serp. ii. t. 22.

Length rather more than one foot. Inhabits the Phillipine Islands.

COPHIAS LEBETINUS,

The Lebetina or Somniferous Snake.

** *Head shielded.*

Spec. Char. *Body* grey, with a quadruple series of alternate transverse spots, inner row of spots yellow, lateral ones black.

Coluber lebetinus; *Lin. Syst. Gmelin*, p. 1094; *Forsk. Egypt.* p. 8, 13. Vipera lebetina; *Daud. Rept.* vi. p. 113. Cophias hypnale; *Merrem, Amph.*

Inhabits Northern Africa, and Southern Europe and Asia.

COPHIAS HALYS.—*The Halys, or Siberian Cophias.*

Spec. Char. *Body* short and thick; *colour* above pale grey, with transverse olive-brown spots; *abdomen* whitish; *head* sub-cordate.

Coluber halys; *Syst. Nat. Gmelin*, p. 1094. *Pallas, Voy. en Russie*, viii. p. 93. Vipera halys, *Daudin, Rept.* vi. p. 129.

A very rare species; a native of the driest parts of the southern deserts of Astracan; thicker, shorter, and more poisonous than our common viper. It was first discovered by the celebrated Professor Pallas, who describes it as frightful, from the thick-set subcarinated scales rising on its back.

COPHIAS CACODÆMON.—*Black Viper, or Demon.*

Spec. Char. *Body* deep black; *head* broad and tumid.

Scytale niger; *Daudin, Rept.* v. p. 312. Black Viper; *Catesby, Carol.* ii. t. 44. *Shaw, Zool.* iii. t. 102.

Length of the common viper, but of a much thicker form, and entirely of a rusty-black colour. It is slow in its motions, and when irritated dilates the head, which is naturally large, to a surprising width, and threatening at the same time with a horrid hiss; the fangs are large, and the animal is said to be as dangerous as the Rattle-snake. It is a native of Ceylon, inhabiting chiefly the higher grounds.

COPHIAS MUTUS.—*The Bush-master?*

Spec. Char. *Body* pale ochraceous or straw-coloured, with a chain of dark reddish-brown rhomboidal dorsal spots; *abdomen* and *tail* beneath without spots.

*** *Head covered with scales; tail ending in a spine.*

Crotalus mutus; *Lin. Syst. Nat.* p. 373. Boa muta; *La Cepede, Serp.* ii. p. 389. Lachesis muta; *Daud. Rept.* v. p. 351. L. atra; *Daud. l. c.* p. 354. Scytale Ammodytes; *Latreille, Rept.* iii. p. 106; *Daud.* v. p. 347. Scytale catenata; *Latr. l. c.* p. 162. Boa crotallina; *Shaw, Zool.* iii. p. 352. Coluber alecto; *Shaw, l. c.* p. 405. Curucucu; *Marg. Brasil,* p. 241. *Seba, Thes.* ii. t. 76, f. 1. Bothrops Curucucu; *Wagler, Serp. Bras.* p. 59, t. 23. Cophias mutus; *Merrem, Amph.* p. 154, n. 1.

Inhabits Brazil and Surinam, in moist woods. It is a large, fierce, and very dangerous reptile, frequently attaining the length of six or seven feet. It is of a pale yellowish colour, marked on the back by a chain of large reddish-brown or black rhomboidal spots, and is armed with very large and strong fangs.

XVIII.

CENCHRIS MOCKESON.

The Mockeson, or Hog-nose Snake.

Gen. Char. *Head* broad; *neck* not dilatable; *sub-caudal plates* double.

Spec. Char. *Body* pale reddish brown, with fourteen or sixteen broad transverse blackish bands, compressed in the middle; *neck* narrow; *abdomen* pale yellow with black spots; *anus* simple.

Hog-nose snake; *Catesby, Carol.* ii. t. 56. Le groin; *La Cepede, Serp.* ii. p. 383. Cenchris Mockeson; *Daudin, Rept.* t. 60, f. 25, and t. 70, f. 3.

In its external appearance the Mockeson has much resemblance to a Rattle-snake deprived of its rattle. The head is large, and covered on the anterior part, behind the eyes, with nine large shining plates, and upon the occiput, as well as upon the spine, with numerous, small, reticulated, and slightly carinated scales. The neck is very narrow; the body grows gradually thicker towards the middle; and the tail, which is tapering and ending in a spine, occupies about a fifth part of the whole length. The scuta of the belly are moderately broad, and according to Daudin, 157 in number; those of the tail are simple, one-rowed, and amount to about thirty-two. The general colour is pale reddish-brown, marked along the upper part of the body and tail with several large transverse dark brown or blackish bands, a little narrower at their centre, and deeper on the back and sides. The posterior sides of the head at the insertion of the jaws are much swelled, and on the upper part of the head, according to Daudin, there are three black spots placed transversely. From the figure here represented, which was drawn from an individual, preserved in the cabinet of Mr. Bell, the head is of a pale yellowish or rose-colour, without

spots. The under part of the animal is yellowish-white marked with dark spots of middling size ; it is furnished with three double scales under the base of the tail, and with a large round scale upon the anterior border of the anus. On each side of the upper jaw is a long slender fang, covered by a sort of prepuce or sheath.

The Mockeson, or as it is sometimes called the *Copper-head* Snake, is found in various parts of the new world, where it inhabits the forests, especially on the borders of lakes, and on the banks of rivers. Our specimen was taken near the Alabama, a large river in the southern part of North America, which empties itself into the Gulf of Mexico. It is a tolerably large species, measuring two feet ten inches in length, and is said to be nearly as poisonous as the Rattle-snake.

Amongst the numerous remedies that have been proposed as specifics for the bite of this and other poisonous reptiles, perhaps the most celebrated is the *Guaco,* a plant which grows in several parts of America, and first described by MM. Humboldt and Bonpland* under the name of *Mikania guaco.* As a preventive against the attacks of venomous serpents, which abound in every part of that vast continent, the natives are said to innoculate themselves with the juice of this plant. When the bite has been inflicted, they apply the leaves of the *guaco*, chewed and mixed with the saliva, upon the wound, and at the same time take the juice of the plant internally, with complete success. Dr. Hancock, however, who resided more than twenty years in various parts of South America, and who had ample opportunities of witnessing the effects and treatment of the bites of poisonous serpents, assures us that amongst thousands of reputed antidotes, there are absolutely none to be depended on as preventive except suction and scarifying ; and for obviating the effects of their absorption, opium, and the class of warm stimulants and diaphoretics. Unfortunately, a superstitious dread prevails against the only certain remedy, not only amongst the natives, but Europeans also, from the fear of imbibing the poison by the mouth, and that, too, even amongst many of the faculty.

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* *Plantes Equinoxiales*, ii. p. 84, t. 105.

CENCHRIS TISSIPHONE.—*Tisiphone Snake.*

Spec. Char. *Body* thick, brown, without variegations; *length* about two feet.

Coluber Tisiphone; *Shaw, Zool.* iii. p. 406; *Catesby, Carol.* ii. t. 45.

Catesby describes this as a very slow-moving and sluggish reptile, advancing deliberately even to escape danger, yet it will defend itself fiercely when attacked. It is found in Virginia and Carolina, where it is called the *Truncheon Snake.* Its bite is said to be very venomous.

PLATURUS FASCIATUS.

Fasciated, or Lead-coloured Platurus.

Pl. XVIII.

Gen. Char.—*Head* indistinct, covered with large plates; *body* cylindrical; *dorsal scales* equal; *tail* compressed, two-edged; *caudal plates* two-rowed; *poison fangs* in the upper jaw.

Spec. Char. *Body* blueish or lead-coloured, with black annular bands; *scales* rhomboidal; *abdomen* yellowish; *muzzle* ochraceous; *head* with a yellow spot between the eyes.

Coluber laticaudatus; *Lin. Syst. Nat. Gmelin*, p. 1107; Idem, *Mus. Ad. Fred.* I. p. 31. t. 16. f. 1. Laticauda scutata; *Laurenti, Syn. Rept.* p. 109. n. 240. La queue plate; *La Cepede, Hist. Nat. des Serp.* in 12mo. i. p. 391. Hydrus Colubrinus; *Schneider, Hist. Nat. Amph. fasc.* i. p. 238; *Shaw, Zool.* iii. t. 123. La Plature fascie; *Latreille, Hist. Nat. des Rept.* in 8vo. iii. p. 186, f. 5; *Daudin, Rept.* vii. p. 226. t. 85, f. 1.

This is an aquatic species, and is found in the Indian and American seas. It is frequently seen towards the coasts of the southern islands

1. 2.

1 Platurus fasciatus | 2 Cenchris Mokeson

in the Pacific. The specimen from which our drawing was made was brought from the Tonga islands. Its general length is two feet and a half; the specimen here represented measured two feet four inches; but Dr. Shaw thinks it probably grows to a much larger size. The head is oval, somewhat convex, and covered with three large plates; the rostrum is obtuse. The scales covering the body are rhomboidal, smooth, shining, imbricated, rather obtuse, and of a paler colour at the apex; the scuta under the belly are short and narrow, being somewhat indistinctly continued in a double series under the tail; the body is cylindrical, rather slender, and the tail instead of being round as in the vipers, is thin and compressed laterally, like the blade of a knife; the extremity is blunt, and terminates in two round scales. The colour of the whole animal is a strong plumbeous or livid blue, with numerous, equidistant, moderately broad, deep brown or blackish bands, from head to tail, each nearly surrounding the body, but being paler beneath than above; a pale yellow tinge is diffused along the abdomen, and over the front of the head; the muzzle is of a reddish yellow colour, and on the back part of the head is a shield-shaped mark, with a small central yellow spot, and a black streak extends behind the eye on each side, immediately above the opening of the mouth. This is a poisonous snake; but the fangs are said to be remarkably small for the size of the animal.

XIX.

HYDROPHIS MELANURUS.

Black-crowned Water-Snake.

GEN. CHAR.—*Head* small, not tumid, and covered with large shields; *body* slender in front, gradually thickening, and covered with scales; *tail* compressed vertically.

Spec. Char. *Body* much compressed; *back* carinated; *colour* yellow, barred from head to tail with deep chesnut fasciæ, widening on the abdomen; *body* alternately flatter on one side than the other.

Hydrus spiralis; *Shaw, Zool.* iii. t. 125.

This elegant species which is described by Dr. Shaw under the name of the Spiral Hydrus, is about two feet in length, and of a slender form; the body compressed throughout; the dorsal carina very acute; that of the abdomen with a flattened edge of scales somewhat wider than the rest, and about the sixteenth of an inch in diameter. The head is small; the mouth wide; the scales on the head large; those on the body rather small, ovate, and slightly carinated. The general colour is yellowish, with bars of deep chesnut brown, each dilating on the belly and the back; from about the middle nearly to the tail is marked with a series of large, round, black spots. The tail is of a black or deep brown colour, very broad, and so very thin on the edges as to be nearly transparent. The most remarkable circumstance in this snake is the singular obliquity of its form, the body in different parts being alternately flatter on one side than the other. It inhabits India, and is in all probability poisonous, but its particular history seems to be very imperfectly known.

HYDROPHIS SHAWII.—*Shaw's Water-Snake.*

Spec. Char. *Body* livid brown, with brown decurrent bands, and hexagonal abruptly carinated bands.

Hydrus Major; *Shaw, Zool.* iii. t. 124.

This is a large species, first accurately described by Dr. Shaw from a specimen in the British Museum. It is more than three feet in length, and of a pale livid colour, marked throughout the whole length of the back and tail by a series of large transverse semi-

decurrent dusky bands. The length of the tail is about four inches; the scales which cover it are of a square or lozenge form, imbricate, and marked by an almost double carina; the scales on the body are chiefly hexagonal, and carinated in the same manner. Dr. Shaw justly supposes it to be of the poisonous kind, as one of the teeth, on each side in the upper jaw is larger than the rest, and on being examined with a lens is evidently tubular, the slit towards the end being much longer in proportion than in that of the rattle-snake. It is found in the Indian seas.

HYDROPHIS NIGROCINCTUS.

Black-banded Water-Snake.

Spec. Char. *Body* olive green above; yellow beneath, with about fifty-eight black or dark blue bands encircling the trunk; *tail* obtuse, with nine circular bands of the same colour.

Keril pattee; *Russel, Ind. Serp.* ii. t. 10.

This snake inhabits the saline waters of a river near Calcutta which intersects the country of Bengal, and is called Sunderbunds. The Indians call it *keril-pattee,* and it appears very venomous. A fowl bitten in the thigh by it was seized with convulsions, at the end of five minutes, and in two minutes more expired.

HYDROPHIS CHLORIS.

Blueish-green Water-Snake.

Spec. Char. *Body* dark blue, intermixed with green; *neck* crossed with bands of greenish yellow; and broader bands of the same colour across the sides and tail.

Shootur Sun; *Russel, Ind. Serp.* t. 7.

Has the same habitat and manners as the preceding species. It is also a native of India, and has been figured and described by Russel.

HYDROPHIS OBSCURUS.—*Dusky Water-Snake.*

Spec. Char. *Neck* bluish-black, with yellow bands; *back* blueish-black, but paler; *sides* and *abdomen* yellow, encircled by faint darkish bands to the end of the tail.

Kalla shootur sun; *Rus. Ind. Serp.* ii. p. 9, t. 8.

This species inhabits India, and is about four feet long. It is called by the Hindoos *Kalla shootur sun.*

HYDROPHIS CYANOCINCTUS.

Blue-banded Water-Snake.

Spec. Char. *Body* pale azure-blue, with circular bands of yellowish white; *tail* blue, flat, short, obtuse.

Chittul; *Rus. Ind. Serp.* ii. p. 10, t. 9.

Inhabits the same places as the six last. It is figured and described by Dr. Russel, under the Indian name *Chittul.* The length is three feet or more.

HYDROPHIS FASCIATUS.—*Fasciated Water-Snake.*

Spec. Char. *Body* black with ascendent yellowish conical spots, with the points towards the ridge of the back; *tip of the tail* black.

Anguis laticauda; *Lin. Mus. Ad. Fred.* ii. p. 43; *Schneid. Amph.* i. p. 240. Tatta Pam; *Russel, Ind. Serp.* t. 44.

1 Hydrophis Melanurus. || 2 Pelamis bicolor.

[illegible] by John Wilson, May 1, 1831

The form of this species is long and slender, and it is of a black colour, fasciated throughout its whole length by numerous yellowish white pointed bands, rising upwards from the abdomen, and almost meeting at their tips on the ridge of the back. It appears to arrive at a considerable size, though the specimen figured by Dr. Russel scarcely measures two feet in length. The teeth in Russel's specimen were very small; but in the larger individuals examined by Schneider, a large, curved fang-like tooth was observed on each side in the upper jaw; hence it is supposed to be a venomous snake.

HYDROPHIS CURTUS.—*Short Water-Snake.*

Spec. Char. *Body* compressed; *head* flattish; *colour* pale yellow, with a series of decurrent dusky bands, somewhat confluent above.

Hydrus Curtus; *Shaw, Zool.* iii. p. 562.

Length about a foot. Inhabits India.

PELAMIS BICOLOR,

Black-backed Pelamis.

Pl. XIX.

Gen. Char. *Head* large, depressed, dilated behind, shielded; *jaws* very dilatable; *body* with small equal square plates; *scales* rather reticulated than imbricated; *tail* compressed vertically.

Spec Char. *Head* and *upper half of the body* dark brown or black; *abdomen* and *sides* pale yellow; *back* carinated; *tail* spotted with black.

Anguis platura; *Lin. Syst. Nat.* 391. Hydrus bicolor; *Shaw, Zool.* iii. t. 126; *Schneid. Amph.* i. p. 240. Pelamis bicolor; *Daudin*, vii. p. 366, t. 89. Nalla Wahlagilee Pam; *Russel, Ind. Serp.* ii. p. 47, t. 41.

THIS singular snake, figured by Seba, vol. ii. t. 77, fig. 1, and by Vosmaer in a Memoir published at Amsterdam, in 1774, has since been described as a new species under the name of *Anguis platurus*, by Gmelin, after Forster, who discovered it about the shores of some of the islands in the Pacific Ocean. It is readily distinguished, as Dr. Shaw justly observes, by the remarkable distribution of its colours; the head and upper parts of the body being of a rich deep chocolate brown colour or black, the lower parts pale yellow, and the tail marked with black bands and spots. A pretty broad longitudinal band of a bright sulphur-yellow colour is represented in Russel's plate, commencing from the cheek, and prolonged regularly on each side to within two inches of the anus. The head is of an elongated form in front, bulging behind, somewhat convex above, and projecting into an obtuse rostrum. The occiput is covered with small suborbicular scales; the anterior part of the head and the rostrum with large plates. The opening of the mouth is very wide; the jaws long, narrow, and nearly equal. According to Russel, the teeth are small and numerous, there being a marginal and two palatal rows in the upper jaw: the nostrils vertical and near each other; the eyes lateral, oval, and of middling size. The body is compressed, and the back highly carinated; the scales on the trunk and tail are square, closely set, but not imbricate, and very numerous. The general length is about two feet and a half; the tail three inches. The annexed figure was made from a specimen in the collection of Mr. Bell.

The Pelamis *bicolor* is found in the Indian seas; and according to the Vizingapatam fishermen, who regard it as a very dangerous serpent, seldom approaches the shore. It is said to be very common at the Island of Otaheite, where it is called by the natives *Etoona-toree*, and is used as an article of food. It feeds principally on the smaller fishes and molluscous animals, which according to Forster it seizes with the utmost address.

PELAMIS SCHISTOSUS.—*Slate-coloured Pelamis.*

SPEC. CHAR.—*Head* and *back* blue; *sides* and *belly* pale buff; *tail* lanceolate and entirely blue.

Hoogli pattee; *Russel, Ind. Serp.* ii. p. 11, t. 10.

A NATIVE of the Indian Seas, and is called by the Hindoos *Hoogli pattee,* and by the inhabitants of the English settlements *Hoglin.* It is about three feet in length; the head is oblong, obtuse, bulges behind, and thicker than the neck; the mouth proportionally large. In the upper jaw, on each side, there is a small poison fang, behind which, placed obliquely, are two or three common teeth. The palatal rows, and teeth in the under jaw, are small. The body is compressed, the abdomen carinated, and covered with small, ovate, slightly carinated, and imbricate scales. The tail is flat, obtuse, with the edges very thin. The upper part of the body and tail is blue, the sides and belly pale buff. A bird bitten in the thigh by this reptile expired in five minutes.

XX.

CHERSYDRUS GRANULATUS.

Granulated Chersydrus.

GEN. CHAR. *Head* and *body* covered with small carinated scales; *posterior part of the body* and *tail* compressed vertically.

SPEC. CHAR. *Body* fuliginous, with white spots; *abdomen* carinated, and marked throughout with whitish ascendant lateral bands.

Hydrus granulatus; *Schneid. Amph. Fasc.* i. p. 243. Achrocordus fasciatus; *Shaw, Zool.* iii. p. 576, t. 130. Hydrus granulatus; *Merrem, Amph.*

This species is about eighteen inches in length, and of a dusky brown colour, with several paler fasciæ, which take their rise from the abdomen, and ascend on the sides. The body is thick, and, as well as the head, is entirely covered with very minute, carinated, rough or warty scales. It inhabits the rivers of Java, and is said to be a poisonous species.

RANA ESCULENTA.

Esculent or Green Frog.

Class Reptilia. *Order* Batrachia, *Cuv.*

Gen. Char. *Body* thick, tailless, a little compressed, elongated, moist, covered with a few small tubercles; *sternum* and *clavicles* distinct; *mouth* toothed; *feet* four, long; *toes* pointed; *larva* elongate, fish-like, tailed, and without legs; *gills* four on each side.

Spec. Char. *Body* transverse, gibbous, green, with black spots, and three longitudinal lines upon the back.

La Grenouille verte; *Daudin*, viii. p. 90. Rana esculenta; *Syst. Nat. Gmelin*; p. 1053. *Rœsel, Hist. Ran.* t. 13. La Granouille commune; *La Cepede*, ii. part iii. art. i. Gibbous Frog; *Pennant, Brit. Zool.* iii. p. 7. Esculent, or green Frog; *Shaw Zool.* iii. t. 31.

The flesh of the green Frog is much esteemed on the continent, particularly in France, Italy, and Germany, as an article of food, and the spawn (*sperma ranarum*) formerly obtained a place in our dispensatories. In its general form this species resembles the common brown Frog, (Rana *temporaria*), but it is larger in size and of an olive green colour, with black spots and strongly marked with three longitudinal lines on the back. It is found abundantly in stagnant waters both in Europe and Asia, though it is much

less common in England than the Rana *temporaria*. At Vienna and in many parts of France, where a great consumption of frogs takes place, they are fattened up in *froggeries* (*grenonillières*) constructed for the express purpose. They are caught either with lines baited with a small bit of scarlet cloth, or in nets, or by means of a rake, which brings them ashore along with the mud.

" It is in autumn, at the moment in which they plunge into the water, where they are about to pass the winter, that their flesh is in most estimation, for at this time it is fatter and of a more delicate flavour. Nevertheless, a greater quantity of it is eaten in spring than in any other season, for the frogs are then more easily caught. There are places in which deposits of frogs are kept in reserve, in gardens furnished with pieces of water, and closed round by walls, to be sold at all times to amateurs. About a century ago or more, they were in great request in Paris. A native of Auvergne, named Simon, made a considerable fortune by fattening up, in a suburb of that city, the frogs which he had collected in his own country. At present they are much less generally eaten in France; but they are constantly to be found in the markets of that country, and those of Italy, in like manner, superabound with them for a certain period of the year.

" The Romans do not appear to have made much use of them as food. Galen says nothing about them in his works. The physicians of the middle ages were in general opposed to their introduction as an aliment, and attributed to them deleterious properties. Aëtius, and Juan Rodriguez de Castellobranco, have particularly declared themselves to this effect. Others would fain have established a distinction between frogs of such as are poisonous and such as are harmless. Matthioli and the celebrated Ulysses Aldrovandi were of this opinion. The latter even mentions a great number of delicate culinary preparations of which frogs constitute the basis. In the sixteenth century, on the continent at least, frogs were served up at the best tables. Champier complains of this taste, which he considers fantastic. It does not, however, appear that this custom was a very ancient one, for, in 1550, the author of a book entitled ' Devis sur la Vigne,' tells us that he laughed, ' de Perdix quand on lui apporta des grenouilles

en facon de poulletz fricassez.' Thirty years afterwards, Pallissy in his treatise 'Des Pierres,' thus expresses himself: 'Et de mon temps j'ai veu qu'il se fust trouvé bien peu d'hommes qui eussents voulu manger ni tortues ni grenouilles.'

"In Germany, all parts of these animals are eaten, the skin and intestines excepted. In France, epicures confine themselves to the hinder quarters, which are dressed with wine, like fish, or with white sauce. Sometimes they are fried, or even spitted.

"Cooks are not the only persons who have studied the art of appropriating frogs to the benefit of man. For a considerable period the continental physicians have employed the flesh of these reptiles, variously prepared, in the treatment of different diseases. Broths are made of it, which are considered restorative, diluent, analeptic, and anti-scorbutic, and are prescribed in various affections of the chest, pulmonary consumption, cutaneous disorders, and many other maladies. Even supposing the utility of such preparations in the cases we have mentioned, it is certain that a great number of physicians have adopted the most absurd notions and practices on this subject. Timotheus, for instance, would apply frogs cut in two on the kidneys of hydropic patients, to attract externally the superabundant serosity in the abdomen. We have heard of the application of a brick-bat, in certain cases, to a particular part of the human body, and we presume that its curative efficacy is fully equal to that of the cataplasm here recommended.

"According to Dioscorides, the flesh of the frog cooked with salt and oil, is an antidote for the poison of serpents; and Arnold informs us that the heart of this animal, taken every morning, in the form of a pill, cured a fistula in the epigastric region, which had resisted many other remedies. With a like degree of νους, some doctors have recommended in epilepsy, the liver of a frog, calcined in an oven on a cabbage-leaf, between two plates, and swallowed in peony-water."* The spawn of frogs was formerly used in external inflammations, as soothing and emollient, and in the old pharmacopœias, oil of frogs is mentioned, but both these remedies are now deservedly neglected.

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* *Animal Kingdom*, by Ed. Griffiths, F.L.S. vol. ix. p. 440.

RANA TEMPORARIA.—*The Common Frog.*

SPEC. CHAR. *Body* reddish-brown or greenish, with a black band extending from the eye and passing over the opening of the ear.

La grenouille rousse a temps noires; *Daudin*, viii. p. 84. Rana temporaria; *Syst. Nat. Gmelin*, p. 1053. La Rousse; *La Cepede, Rept.* ii. part. iii. art. 2. Common frog; *Pennant, Br. Zool.* iii. p. 3; *Shaw, Zool.* iii. t. 39.

THIS well-known animal is common throughout Europe, in moist meadows, and on the banks of ponds and rivulets. It is called the *red frog* by the French, and differs from the esculent species both in colour and habit, though it is sometimes confounded with it. It prefers mountainous situations, and is commonly found on land in the summer season, while the green frog rarely leaves the water. It is said to be very commonly used as food in the central parts of France, and that the hind-quarters are as good *en fricassee* as those of the green frog.

BUFO VULGARIS.—*Common Toad.*

GEN. CHAR. *Body* thick, short, broad, and warty above; *head* thick and short; *eyes* large and protuberant, with a vertical pupil; *tongue* short and thick; *mouth* toothless; *skin* dilatable by inflation; *fore-feet* with four separate toes, the thumb larger in the male; *hinder-feet* short and generally palmated with five toes; all the toes pointed, but without claws.

SPEC. CHAR. *Body* pale reddish ash-coloured, sometimes olive or blackish; *back* covered with numerous red rounded tubercles; *belly* reddish-white, with smaller tubercles; *hind-feet* semi-palmate.

Φρυνος; *Arist. Hist. An.* lib. ix. c. 1, 40. Rubeta; *Plinii, Hist.* lib. viii. c. 31. Bufo sive Rubeta; *Raii, Syn. Quadr.* 252. Bufo terrestris; *Rœsel, Hist. Ran.* 85, t. 20. Bufo vulgaris; *Laurent. Amph.* 28. Rana Bufo; *Syst. Nat. Gmel.* 1047. Le Crapaud cendre a pustules rouses; *Daudin*, viii. p. 139.

THE common Toad is an animal too well known to require any particular description of its form and habits. It is found throughout Europe in obscure moist situations, feeding on slugs, worms, and insects. When irritated or terrified it exudes from the pores of the skin an acrid liquid, which, though not venomous, as was formerly supposed, is sufficiently irritating to affect delicate parts of the skin of an animal that it touches. The flesh of the toad, so far from being poisonous, is said to afford as wholesome nutriment as that of the frog; and at Paris the thighs of these animals are constantly sold for the thighs of frogs. In Africa and America, the larger species are habitually eaten by the negroes, and the flesh has been compared to that of veal or chicken.

This disgusting reptile formerly obtained a place in our dispensatories. The old physicians employed it in a variety of pharmaceutical preparations. It is said to have been first introduced into medicine in consequence of a cure performed upon a dropsical person, to whom powdered toads were given in order to dispatch him, but he voided a large quantity of urine after taking them, and soon afterwards recovered. Hence the flesh dried and powdered was considered diuretic and diaphoretic. This preparation was likewise applied externally to the navel, to restrain hæmorrhages, particularly those from the uterus. It was prescribed living as a topical application to cancerous ulcers, and in cases of cephalalgia and epigastralgia. "Etsi," says Schrœder, "animal sit deterrimum, venenosum, ac abominabile, attamen non effugit usum medicum. Interne pulvere ejus hydropicorum aquas per urinam educi, desperatus quidam expertus est hydropicus, qui preter spem attentatæ necis sanitatem illo acquisivit. Extrinsecus impositur, parte qua venter est, anthracibus ad eliciendum venenum. Ingreditur itidem amuleta, aëri contagioso arcendo dicata; hæmorrhagiam narium, certo experimento sistit. Idem et pulvis cinis prestare perhibetur. Renibus impositus aquam inter cutem

Drawn by Joffroy

Engelmann l

1. Chersydrus granulatus ‖ 2 Megalops Thrissa

London Published by John Wilson May 1.1831

per urinam pellere dicitur, umbilico alligatus, fluxus hystericos retrahit et inhibet. Plantis pedum appositus capitis, cordisque morbis, phrenitidi, febribusque succurrere statuitur." It is almost unnecessary to observe that these observations are entirely visionary and hypothetical, and the Toad and its preparations, have long since been banished from medical practice.

Class IV.—PISCES. (*Fishes.*)

Vertebrated animals, with cold red blood, respiring by gills or branchiæ, and moving in the water by the aid of fins.

MEGALOPS THRISSA.

Poisonous Sprat.

Pl. XX.

Order Abdominales. *Lin.* Malacopterygii Abdominales. *Family* Clupeæ, *Cuv.*

Gen. Char. *Eyes* very large; *rays* twenty-four or more on the branchial membrane; last ray of the *dorsal fin* terminating in a long filament.

Spec. Char. *Head* small, compressed, and without scales; *lower jaw* bent upwards, and terminating in a point, which fills the notch in the upper; *body* blueish silvery, dusky on the back; *pectoral fins* red; last ray of the dorsal fin much elongated.

Clupea Thrissa; *Syst. Nat. Gmelin*, p. 1406; *Osbeck, Reiss.* p. 336; *Bloch, Ichthyologie*, xii. p. 27, t. 404. Clupea minor; *Brown, Jam.* p. 443. Caillen-Tassart; *Duhamel, Trait. de Pech.* ii. p. 548, t. 31, f. 3. Borstenflosse; *Mull, L. S. T.* iv. p. 374. Alosa argenteo-cœrulea pinnula caudata recta. Savalle; *Plumier*, MSS.

Nearly all the species belonging to this class of animals are used as food, and many of them afford a sufficiently nutritive and wholesome aliment. But there are some fishes, especially among those inhabiting the tropical seas, which, though eaten with perfect safety at times, are occasionally poisonous. These are the Carribean, or Yellow-bill Sprat, the Barracuda, Sun-fish, and a few more; none of which appear to frequent the British shores. Of all these the most active and dangerous is the Sprat here represented, which has in several instances been known to destroy life in the space of half an hour. It is a small fish, seldom exceeding twelve inches in length. The head is small, compressed, and without scales; the mouth is small; the lower jaw is slightly bent upwards, terminating in a point, which fills up a cavity in the upper; there are no teeth, but the tongue is hard, and the palate is lined with a rough membrane. The eyes are almost vertical, and very large; the pupil is black, and inclosed by a silvery iris. The general form of the body, which is compressed vertically, resembles pretty nearly that of the common herring; the abdomen is arched and serrated beneath. The scales are broad, thin, imbricated, and closely attached to the skin. The colour is blueish, silvery, with a dusky tinge on the back; the belly is white, the head yellowish, and a pale yellow line runs along the sides from the gills to the tail. The dorsal fin is slightly scaled at the base, and terminated behind or at the shallowest part, by a very long single ray, extending nearly as far as the base of the tail, which is strongly forked. According to Bloch, the pectoral fin has thirteen rays, the ventral eight, the anal and tail twenty-four each, the dorsal sixteen; all the fins are blueish, except the pectoral, which are red.

This species is a native of the Indian and American seas. Osbeck and Ellis speak of it as occurring in China; Plumier observed it at the Antilles, where it is called *savalle*; Brown found it at Jamaica; and Dr. Blagden at Carolina. During the spawning season, which takes place in April and May, it ascends the rivers, and deposits its eggs among reeds and aquatic plants.

The symptoms which usually ensue from eating the poisonous Sprat are nausea, flushings in the face, vertigo, violent heat and itching over the whole body, sometimes accompanied by a papular

eruption or efflorescence on the skin, violent pain in the stomach, tenesmus, great acceleration of pulse, cold sweats, insensibility, convulsions, and death. In some cases, where the fish does not prove immediately fatal, the whole surface of the body acquires a deep yellow hue, as in jaundice, and the urine is likewise highly tinged of the same colour.

The cause of this deleterious quality in fish is still involved in considerable obscurity. By some the poisonous principle has been ascribed to copper, with which the fish becomes impregnated from the copper bottoms of ships. It has, however, been remarked that copper does not cause the symptoms described above, and on chemical examination no traces of copper can be detected in any part of the poisonous fish. Dr. Burrows, the author of a very excellent paper on this subject in the *London Medical Repository*, vol. iii. p. 445, is inclined to think that the poisonous quality of fish is not confined to any particular part of the animal. He observes that it does not exist in the skin, or in the stomach and intestinal canal, or in the liver and gall-bladder exclusively, although there is no doubt that persons have been poisoned from eating these various parts. It pervades the whole fish; and this is abundantly proved by the statements of Dr. Chisholm, and the numerous authors adduced by him. The theory which ascribes the effects of poisonous fishes on the human system to changes induced by the substances on which they feed (the Medusæ and Holothuriæ) is well known to be unfounded. Many facts have been adduced by Kœmpfer, Clarke, Forster, Thomas, Chisholm, and others, to show that the Yellow-bill Sprat, Barracuda, and other poisonous fishes, when eaten fresh or having no marks of disease, were perfectly harmless, and that the same fish, whether fresh or salted, on the following day was highly poisonous. Hence Dr. Burrows concludes that the poisonous quality is occasioned by some morbid change in the system of the fish, and that this quality is a poison *sui generis*, always more active after the vital powers cease.

With respect to the *treatment* of poisoning with fish, the primary object is to remove the noxious matter from the stomach. This is to be accomplished by emetics, administered in the usual way, or by the use of the stomach-pump. The best emetic is the sul-

phate of zinc, in the dose of one scruple or half a drachm, which may be repeated at proper intervals, and the vomiting encouraged by copious draughts of mild diluent liquors. In some cases purgatives may be given with advantage. If, however, severe vomiting or diarrhœa take place spontaneously it may sometimes be advisable to check it by opium. In order to counteract the deleterious effects that arise from fish-poison, wine, spirituous liquors, capsicum, and other powerful stimulants have been recommended. The muriate of soda, alkaline salts, lime-juice, and some other substances have also been employed as antidotes; but sugar, in the form of simple syrup, appears to be the only remedy deserving of credit. The surest criterion hitherto discovered for detecting the poison is to give a portion of the liver or entrails to some inferior animal, such as a dog, a cat, or a duck, and to ascertain its effect on them before making use of the fish.

XXI.

SPHYRÆNA BARRACUDA.

The Barracuda, or Barracuda Pike.

Order Abdominales Acanthopterygii, *Lin.* *Family* Percoides, *Cuv.*

Gen. Char. *Body* elongated; *snout* pointed; *jaws* much cleft; *under jaw* longest, with a row of conical teeth, of which the two anterior are largest; *intermaxillaries* with two strong teeth before, followed by a row of smaller ones, and a row of strong ones on each palate bone; *cheeks* and *operculi* scaly.

Spec. Char. *Body* deep blue above; *sides* brownish; *abdomen* silvery white; *tail* forked.

Barracuda; *Catesby*, *Carol.* ii. f. 1. Esox barracuda; *Shaw*, *Zool.* v. p. 105. Sphyrene barracuda; *Cuv. Hist. Nat. des Poiss.* iii. p. 253, t. 66.

The Barracuda is another fish, nearly allied in habit to the common Pike, but of a more slender form, which it is proper to notice on account of its great activity as a poison. It inhabits the tropical seas, and is found in great abundance about the West India Islands, and on the coast of Brazil. According to Catesby, its usual length is from six to eight feet. The head is narrow, oblong, flattened horizontally and compressed on the sides; the eyes are large; the mouth very wide, with the under jaw longer than the upper, which is armed with four large teeth placed at the fore part of the jaw, with a row of ten smaller ones next the head; the upper jaw is also furnished with several large curved teeth. The body is long, and covered with large scales; the back is of a deep blue colour, the sides pale brown, and the abdomen silvery white. The dorsal fins are two in number; the first, which is six-rayed, situated on the middle of the back, and the second towards the tail, opposite the anal fin. The belly is broad, laterally compressed, and the tail pretty deeply forked.

The Barracuda is said to be an exceedingly strong, fierce, and dangerous animal, swimming with great celerity, and preying on the smaller fishes. It is even said to attack bathers, and that far from being intimidated by noise or splashing in the water, it is thereby excited to greater fury against its victims. The flesh, which is rank and unpalatable, produces, when eaten, violent tremblings, nausea, vomiting, pains in the joints, falling off of the nails and hair, convulsions, and even death; yet in spite of these noxious qualities, we are assured by Catesby that the hungry Bahamans frequently make their repast of its unwholesome carcase.

The colour of the teeth is said to be the best *test* of the goodness of the fish. When the teeth are black or discoloured no doubt can remain of its poisonous property; and it is generally received as a fact, that when any of this kind of fish have proved poisonous, they have been found with black or discoloured teeth; and, on the contrary, that there has seldom been an instance of the white teethed Barracuda being unwholesome.

XXII.

TETRAODON OCELLATUS.

Ocellated Sun-fish.

Order BRANCHIOSTEGI, *Lin.* PLECTOGNATHI. *Cuv.*
Family GYMNODONTES, *Cuv.*

GEN. CHAR. *Jaws* divided in the middle by a suture in such a manner as to present the appearance of four teeth, two above and two below ; *skin* furnished with small spines ; *body* capable of inflation.

SPEC. CHAR. *Body* dull green above, whitish beneath, with a black crescent over the shoulders and spot on the back, both edged with yellow.

Piscis venenosus de *Opblaser* dictus; *Kæmpfer*, *Amæn.* p. 883. Tetrodon fascia semilunari in dorso; *Bloch*, *Ichthyol.* v. t. 145. Tetrodon ocellatus; *Syst. Nat. Gmelin*, iii. p. 1445.

Herrison-croissant, Fr.; *Geflleckter Stachelbauch*, Ger.; *Kai-po-y*, Chin.; *Furube*, Jap.

THE Tetraodon *Ocellatus*, a fish which is common in the Indian Seas, is known to possess very deleterious properties. It is a diminutive species, varying in length from four to six inches. The head is small and somewhat compressed laterally; the opening of the mouth is round ; the jaws bony, and furnished at the tip with two broad flattish teeth. The body is thick, ovate, contracting suddenly towards the tail, and thickly studded beneath with short spines. The prevailing colour is deep green above, gradually growing paler on the sides and abdomen, which is whitish. The eyes are middle-sized, and placed high and rather distant from the mouth. Across

the middle of the back, reaching to each pectoral fin, is a broad black crescent, bordered with yellow, and pointing backwards. At the base of the dorsal fin is a round black spot surrounded with yellow. There is no ventral fin. The tail is small and slightly rounded. Like the other species of this genus the ocellated Tetraodon possesses the singular power of inflating its abdominal cavity at pleasure. This inflation is produced by air sent from the gills into a sac formed of a duplicature of the peritoneum, which aids the animal in the water, and brings the organs of defence into a more favourable position for resistance.

The Ocellated Sun-fish abounds on the coasts of China and Japan. It is accounted very delicious by the inhabitants of the latter country, but is known to be so poisonous that the military are forbidden, by a royal edict, from eating it. If properly cleaned before dressing, and eaten as soon as caught, it may be partaken of without much danger. Rumphius says its poisonous effects may be removed by the timely administration of a vegetable which he calls *rex amaroris*.

TETRAODON SCELERATUS.—*Noxious Sun-fish.*

SPEC. CHAR. *Head* very large; *length* two feet or more.

Tetrodon sceleratus; *Syst. Nat. Gmelin*, i. p. 1444; *Forster, Voy.* i. p. 643.

ANOTHER fish of the same genus, the Tetraodon *sceleratus*, or Noxious Sun-fish, is said to produce very dangerous symptoms when taken as food. It is a native of the American and Pacific Oceans, and is mentioned by Kœmpfer as occurring at Japan, where it is sometimes employed as a means of committing suicide. "People," says he, "that by some long and tedious sickness are grown weary of their lives, or are otherwise under miserable circumstances, frequently choose this poisonous fish instead of a knife or halter to make away with themselves. A neighbour of my servant, at Nagaski, being so strongly infected with a certain disease that his nose was ready to drop off, resolved to take this meal, in

order to get rid at once of his life and his distemper. Accordingly he bought a good quantity of this poisonous fish, cut it in pieces, and boiled it; and in order, as he thought, to make the poison still stronger, he took soot from the thatch and roof of his house and mixed it with the rest. After dinner he laid himself down to die, and soon falling mortally sick, he brought up, not only the poison he had taken, but a large quantity of viscid matter, probably not the least cause of his distemper, and by this means found life and health in what he sought for death, for he recovered and was well afterwards."

Fish, considered as an article of food, is regarded as light and easily digested, and therefore well suited to the young, the weak, and the sedentary. Experience, however, shews that it affords a less nourishing aliment than flesh, and is less easy of digestion and assimilation. In some constitutions fish of the most wholesome kind, such as salmon and turbot, disagrees with the stomach, producing nausea, vomiting, pain in the bowels, febricula, and an eruption on the skin resembling the nettle-rash. The conger-eel, (*Murœna conger L.*) the bonito, (*Scomber pelamis,*) the file-fish, (*Balistes monoceros,*) the porcupine diodon (*Diodon hysterix*), the rose-red sparus (*Sparus pagurus,*) and some others, are more especially liable to prove deleterious, and have been known, in many instances, to cause very violent symptoms, and even death.

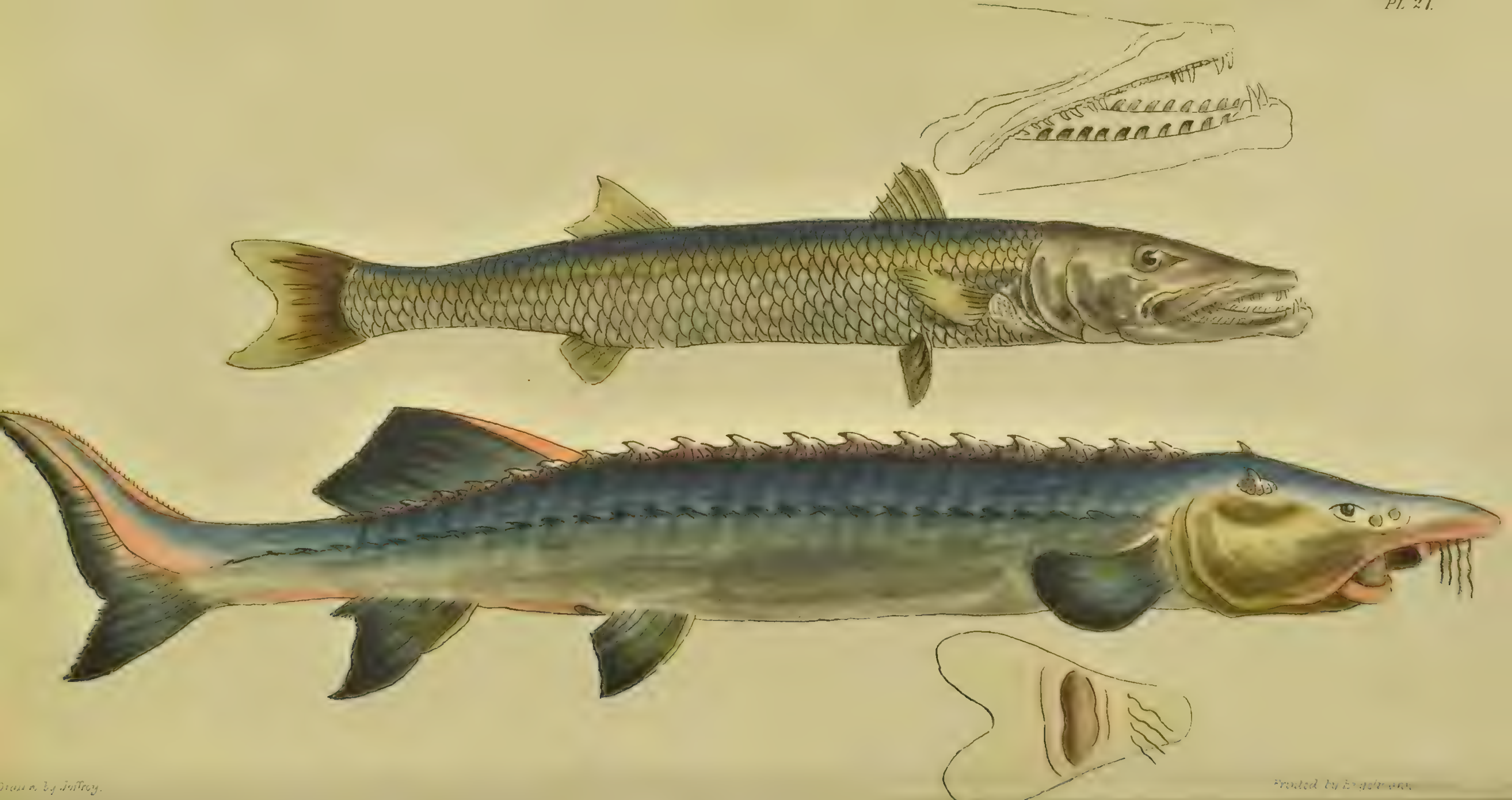
ACIPENSER HUSO,

The Great, or Isinglass Sturgeon.

PL. XXI.

Order CHONDROPTERYGII, *Lin.* STURIONES, *Cuv.*

GEN. CHAR. *Body* elongated, and furnished, as well as the head, with rows of bony prominences; *mouth* placed under the snout, cylindrical, retractile, and without teeth; *cirri* four, beneath the snout.



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SPEC. CHAR. *Body* dusky bluish above; *sides* bluish; *abdomen* slightly silvery, white; *fins* greyish; *cirri* short; *skin* rather smooth; *lateral tubercles* somewhat obliterated.

Αντακαιος; *Ælian*, lib. 14, cap. 23, 26. Atillus; *Plin. Hist. Nat.* l. 9, c. 15; *Belon, Aquat.* 102. Atilus Pado; *Rondel. de Pisc.* ii p. 173. Huso; *Adrov. de Pisc.* p. 504. Huso Germanorum; *Willughb. Ichthy.* p. 243, t. p. 7, f. 1, 2; *Raii, Syn.* p. 113. Acipenser tuberculis carens; *Artedi, Syn.* p. 92. Acipenser Huso; *Syst. Nat. Gmelin*, i. p. 1487; *Bloch, Entomol.* iv. p. 86, t. 129; *Shaw, Zool.* v. t. 159.

Le grand Esturgeon, Fr.; *Adello*, It.; *Der Hausen*, Ger.; *Beluga*, Russ.

THE Isinglass Sturgeon is one of the largest of the cartilaginous fishes, growing to the length of twenty or twenty-five feet. In its general form it resembles the common Sturgeon, from which it principally differs in colour, and in having the tubercles on the back and sides much less protuberant. It inhabits the Northern, Caspian, and Mediterranean Seas, ascending the larger rivers and lakes, and returning to the sea again in autumn, after having deposited its spawn. It is taken in the greatest abundance in the Wolga and the Danube.

The body is long, slender, pentagonal, gradually tapering towards the tail, and covered throughout the whole length by five rows of bony tubercles, rounded at the base, radiated, and of a conical form: of these tubercles one row is situated on the back, and two rows on each side. In aged individuals these tubercles along the sides are smaller, and those on the sides sometimes altogether wanting. The head is large and thick, sloping on each side, and covered with bony plates; the snout is long, obtuse, and furnished beneath, before the mouth, with four worm-shaped beards or cirri; the mouth is placed beneath the upper part of the head, and consists of an oval orifice, as in the common sturgeon, entirely destitute of teeth, but much larger, and furnished with very thick crescent-shaped lips. The gill-cover, on each side is composed of a smooth simple roundish plate. The skin is smooth and viscid. The pectoral fins are oval; the dorsal fin large, and situated very

near the tail; the ventral and anal fins are also small; the tail is slightly forked, the upper lobe being elongated by a bony ridge and extending far beyond the lower. The prevailing colour is brown or dark blueish above without spots, and silvery white beneath.

It is from the sound or air bladder of this and other species of the sturgeon that the well known substance, called isinglass, is prepared. The Acipenser *huso* affords the best, but the sounds of all fresh water fish yield more or less fine isinglass, particularly the smaller sorts, found in prodigious quantities in the Caspian Sea, in the Wolga, Danube, Yaik, Don, and even as far north as Siberia. The sounds of the cod-fish, hake, and ling, are frequently employed as a substitute for those of the sturgeon. From the sounds of some of the species of the perch an isinglass is prepared, little inferior to that which is obtained from the air-bag of the sturgeon. An inferior kind is manufactured from the bones, fins, and useless parts of fishes. These materials are boiled in water, the fluid skimmed and filtered, and afterwards concentrated, until it readily gelatinizes on cooling. The method of making isinglass was long a secret in the hands of the Russians, but it has been discovered, and a full account of it published by Humphrey Jackson, Esq., in the 63rd vol. of the Philosophical Transactions.

The production of isinglass requires no artificial heat, neither is the matter dissolved for this purpose, as its fibrous texture would be destroyed by solution, and the mass would become brittle in drying, like glue. It differs from the latter by its fibrous texture, and in being colourless and more transparent. "If," says Mr. Jackson, "what is commercially termed *long* or *short stapled* isinglass be steeped a few hours in cold water, the entwisted membranes will expand and re-assume their original beautiful hue, and, by a dexterous address, may be made perfectly unfolded. By this simple operation we find that isinglass is nothing more than certain membranous parts of fishes, divested of their native mucosity, rolled and twisted into various forms, and dried in the open air. The sounds or air-bladders of fresh water fish in general are preferred for this purpose, as being the most transparent, flexible, delicate substances. These constitute the finest sorts of isinglass;

those called *book* and ordinary staple are made of the intestines, and probably of the peritoneum, of the fish. The sounds which yield the finer isinglass consist of parallel fibres, and are easily rent longitudinally; but the ordinary sorts are found composed of double membranes, whose fibres cross each other obliquely, resembling the coats of a bladder.

"Isinglass receives its shape in the following manner: the sounds are taken from the fish while it is fresh, slit open, well washed, divested of every thin membrane which envelopes the sound, and then exposed to stiffen a little in the air. In this state they are formed into rolls, about the thickness of a finger, and in length according to the intended size of the staple; a thin membrane is generally selected for the centre of the roll, round which the rest are folded alternately, and about half an inch of each extremity of the roll is turned inwards. Having thus settled the proper dimentions, the two ends of what is called the *short staple* are pinned together with a small wooden peg; the middle of the roll is then pressed a little downwards, which gives it the resemblance of a heart, and thus it is laid on boards, or hung up in the air to dry. The sounds which compose the long staple are larger than the former, but the middle part of the roll is bent more considerably downwards, and, in order to preserve the shape of the three obtuse angles thus formed, a piece of round stick is fastened in each angle with small wooden pegs, in the same manner as the ends. It this state it is permitted to dry long enough to retain its form, when the pegs and sticks are taken out, and the drying completed. Lastly, the pieces of isinglass are joined together in rows, by running packthread through the peg holes, for the convenience of package and exportation.

"The membranes of the *book* sort being thick and refractory will not admit of the same formation, and therefore the pieces, after their sides are folded inwardly, are bent in the centre, in such manner that the opposite sides resemble the cover of a book, whence its name; a peg, run across the middle, fastens the sides together, and thus it is dried like the former. The *cake* isinglass is formed of the bits and fragments of the staple sorts, put into a

flat metal pan, with a very little water, and heated just enough to make the parts cohere, when it is dried; but this is of little value."

The manufacture of isinglass is carried on during summer only, as frost is said to impair its qualities. It is principally imported from St. Petersburgh, in bales. Four sorts are known in commerce, viz. *long staple, short staple, book,* and *leaf*. The finest is that which has the longest staple; it is the thinest, whitest, and most transparent. In London the staple is generally picked in shreds, in which state it is sold; but as it is frequently adulterated with pieces of bladder, and the dried skins of soles, it should always be purchased in the staple. The fish-skin and pieces of bladder may easily be detected by their insolubility in hot water.

Isinglass is of a fibrous texture, semi-transparent, and nearly colourless; its taste is insipid, and it has no smell. It consists of nearly pure gelatin, and is therefore almost entirely soluble in boiling water, forming a pretty firm gelatinous, somewhat opalescent mass. It is soluble in the acids and pure alkalies, but is precipitated from its solutions by infusions and decoctions of astringent vegetables, the tannin of which forms with it an insoluble compound. The metals in their pure state have no action upon isinglass, but several of the metalic salts precipitate it from its solutions. Alcohol does not dissolve isinglass, but separates it from water, when added to its solution.

Medical Properties and Uses.—Isinglass dissolved in water or in milk, is sometimes used in medicine as a demulcent, and when rendered grateful by the addition of a little sugar and lemon juice, as a mild nutritive jelly, well adapted to the sick and convalescent. A solution of this substance in water, with a very small proportion of tincture of benzoin, or of tolu, spread on black silk, is the court-plaister of the shops. But the greatest quantities of isinglass are consumed by wine-merchants and brewers, for fining beer and vinous liquors.

ACIPENSER RUTHENUS.

The Little Sturgeon or Sterlet.

Spec. Char. *Body* elongated, brownish; *sides* spotted with pale red; three rows of bony plates above; the lateral ones carinated and numerous, and those of the belly flat.

Acipenser ex cinereo flavo et rosaceo varius; *Klein, Misc. Pisc.* iv. p. 13, n. 4, t. 1. Acipenser Ruthenus; *Syst. Nat. Gmelin*, i. p. 1485; *Wulf. Ichth.* p. 17; *Bloch, Ichth.* iii. p. 88, t. 89; *Shaw, Zool.* v. p. 376, t. 160.

Le Sterlet, Fr.; *Sterlet*, Ger. et Swed.; *Sewruga Sterljed*, Russ.

The Sterlet is the smallest species of Sturgeon hitherto discovered, rarely exceeding three feet in length. It is principally found in the Danube and other rivers which run into the Black and Caspian Sea, sometimes in the Baltic, and also, it is said, in some of the large lakes of Sweden and Pomerania. The head of this species is longer in proportion than in other sturgeons, the snout straight and subulate; the body rather more slender, and the bony shields with which the upper parts are covered less protuberant, and of a thinner substance. The prevailing colour above is brownish; whitish, and marked with rose-coloured spots, beneath. The rows of tubercles are of a pale yellow colour; the skin is rough and scaly; the ventral and anal fins are of a deep rose-colour, the rest blueish-brown.

The Sterlet, like the rest of the genus, ascends the the rivers in the northern seas, in great numbers, to deposit its spawn, in the months of May and June. It is frequently taken for the sake of the swimming-bladder, which affords a very fine isinglass, but principally for its flesh, which is highly prized as an article of food, and

is even considered as one of the most delicate of fishes. Sterlet soup is said to have formed one of the favorite luxuries of the famous epicure Prince Potemkin, of Russia, who in seasons when the fish was remarkably dear, was content to purchase it at a price so extravagant that a single tureen cost him the enormous sum of three hundred rubles. In Russia, the Sterlet makes its appearance chiefly at tables of the nobility, and the caviar prepared from its roe is confined almost exclusively to the use of the royal table.

ACIPENSER STURIO.—*The Common Sturgeon.*

SPEC. CHAR. *Body* long, pentagonal, cinereous, with dusky variegations, and covered with five rows of bony tubercles, one on the back and two on each side; *abdomen* whitish; *pectoral fins* oval; *dorsal fin* near the tail; *tail* bifurcated, the upper lobe much longer than the under.

Acipenser; *Plin. Hist. Nat.* l. 9. c. 17, l. 32, c. 11. Acipenser Sturio; *Syst. Nat. Gmelin*, i. p. 1483; *Bloch, Ichth.* iii. p. 80, t. 88; *Shaw, Zool.* v. p. 371, t. 159. *Esturgeon*, Fr.; *Sturione*, It.; *Der Stoer*, Ger.

THE Sturgeon is a large fish, growing to the length of eighteen or twenty feet. It is sometimes taken in the Thames; and is found in all the European and American Seas, whence it ascends the larger rivers and lakes connected with them in April and May, to deposit its spawn, and returns to the sea again in autumn. The Sturgeon is admired for the delicacy and firmness of its flesh, which is white, and when roasted is said to resemble veal. Of the roe, properly salted and dried, is prepared the substance called *caviar*, and the sound affords an inferior sort of isinglass.

ACIPENSER STELLATUS.—*Stellated Sturgeon.*

Spec. Char. *Body* dusky brown, spotted with white on the lower part of the sides; *abdomen* white; *snout* somewhat spathulate, recurved; *cirri* near the mouth; *lips* entire.

Acipenser Kostar; *Gmelin, H.* iii. p. 238; Acipenser stellatus; *Syst. Nat. Gmelin*, i. p. 1486.

Closely allied to the Sterlet, but distinguished from it by its more slender form, its longer fins, its subtetragonal head, and by having the sides marked with white spots. It is found in the Caspian sea, from which it migrates in large shoals into the rivers, and it is also common in the Danube. Length from four to five feet.

INVERTEBRATA.

Animals destitute of a vertebral column and bony skeleton, for the protection of the brain and spinal marrow.

Class V.—MOLLUSCA.

Invertebral, soft, inarticulated animals, furnished with a more or less prominent head at their anterior part.

SEPIA OFFICINALIS.

Officinal Cuttle.

Pl. XXII.

Class Vermes, *Lin.* Cephalopoda, *Cuv.* *Order* Cephalopoda, *Lam.*

Gen. Char. *Body* fleshy, depressed, contained in a sac, which is obtuse behind, and furnished on each side throughout its whole length with a narrow *back*, strengthened by a calcareous plate, lodged in a peculiar cavity; *mouth* terminal, surrounded with eight arms, furnished with pedunculated suckers having their margins surrounded by a corneous ring.

Spec. Char.—*Body* smooth, whitish, with purple spots; *arms* pedunculated, nearly as long as the body; *dorsal plate* elliptical.

Sepia officinalis; *Syst. Nat. Gmelin*, p. 3149; *Lamarck, Anim. sans Verteb.* vii. p. 668; *Encyl. Method.* t. 76, f. 5, 6, 7; *Pennant, Br. Zool.* iv. p. 117.

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1. *Tetraodon ocellatus*   2. *Sepia officinalis*

London Published by John Wilson, June 1, 1831

The Officinal Cuttle, or Cuttle-fish as it is improperly called, is found in the Mediterranean and European seas. It is the species which furnishes the *cuttle-bone* of the shops. The body or tunic is destitute of any appendages, smooth, oval, fleshy, and a foot or rather more in length. On the summit of the head there is a flattened disc, in the centre of which is seated the mouth. Round the margin of this oval disc are placed the arms or tentacula, which are eight in number, of a conical shape, and beset on their central aspect with numerous suckers, by which the animal is enabled to fix itself to different substances, and to seize its prey. Between this circle of arms, and the tunic or sac, there are situated two pedunculated organs, considerably longer than the body, terminating in a broad oblong expansion also covered with suckers. These pedunculated bodies have generally been regarded as feet, and like the tentacula, are capable of being moved, at the will of the animal, in every direction, and are the organs by which progressive motion is performed. In the space between the head and tunic in front, there is an opening with a projecting aperture, which communicates with the cavity of the sac, and serves to convey water to the gills and to carry off the different secreted matters. The skin of the tunic is smooth, of a lead grey colour, and variegated with purple spots. The eyes are large, and seated one on each side of the head. The sac is furnished on each side with a narrow fin, and strengthened on the back by a calcareous plate, lodged in a peculiar cavity. This plate has long been known under the name of *cuttle-fish bone*. It is of an oval shape, convex on both sides, and thickest in the middle. According to Dr. Fleming, it consists of three central laminæ, arranged parallel to one another. The officinal cuttle inhabits the British seas; and although seldom taken, the bone is frequently cast ashore on different parts of the coast.

Properties and Uses.—The term bone has been improperly applied to the dorsal plate of the Cuttle; for, according to the experiments of Mr. Hatchett, its composition is exactly similar to shell, and consists of various membranes hardened by carbonate of lime, without the smallest portion of phosphate. It was formerly much prized as an absorbent for correcting acidities in the digestive organs, and is still used as a dentifrice; but it is principally sought

after for the purpose of polishing the softer metals. The black fluid which some of the species of this tribe of animals secrete, when dried, is used as a pigment, and is said to form the basis of China ink.

Many of the Sepiaceæ were formerly used as food; and Aristotle informs us that they were considered in the best condition for the table when nearly ready for spawning. Among the ancients, Diphelus, Paulus Ægineta, and Galen, observed that they were esteemed highly nutritious and aphrodisiac; and Ætius recommended them to those who were weak in the palestra. The modern Greeks and Romans are said to use them still as articles of food, and consider the eggs as a great delicacy.

Class VI.—CONCHIFERA.

(*Mollusca Acephala*, Cuv.)

Animals soft, inarticulated, destitute of head or eyes, and always fixed in a bivalve shell; branchiæ external; circulation simple; heart unilocular.

OSTREA EDULIS.

The common Oyster.

Order Testacea, *Lin.* Monomyaira. *Family* Ostracea, *Lam.*

Gen. Char. *Shell* adhering, inequivalve, irregular; *upper valve* advancing as the animal increases in age; *hinge* toothless; *ligament* attached to the internal cavity; one muscular impression on each valve.

Spec. Char. *Shell* suborbicular, rugged, with transverse membranaceous folds; *upper valve* flat.

Ostrea edulis; *Lister, Hist. Conch.* t. 193-4; *Da Costa, Brit. Conch.* t. 11, f. 6; *Lin. Trans.* vi. t. 18, f. 9, 10: *Pennant, Br. Zool.* iv. 225; *Syst. Nat. Gmel.* p. 3334; *Brown, Illust.* t. 31, f. 19.

THE shell of the common Oyster is more or less orbicular, but subject to considerable variation in size and form. It is composed of two unequal valves, one of which is smaller, flat, and entire; the other, adhering to marine bodies, is larger and convex. The valves are rough externally, of a dull brown colour, often distorted, plicated at the edges, and of a pearly white within. There are no teeth in the hinge, but an elastic ligament placed in an oblong furrow under the beak.

The Oyster inhabits the European and Indian Oceans. It is found in great abundance on many of the British shores, which were famed from the earliest times for producing the best Oysters, and from whence they were sent in quantities to supply the stews of ancient Rome. Thus Juvenal, in satirizing a Roman epicure, says;—

Circæis nata forent, an
Lucrinum ad saxum, Rutupinove edita fundo,
Ostrea, callebat primo deprendere morsu.

Colchester and Melton are the places most celebrated for oysters, and, when taken, they are generally laid down near the shore in layers, and fed before being brought to market. At present the best Oysters on the British shores are said to be found at Purfleet, and the worst near Liverpool.

MEDICAL USES.—Oyster-shells have long been admitted into the pharmacopœia, on the supposition that they afford a variety of carbonate of lime, more free from gritty particles and purer than prepared chalk. They consist of alternate layers of carbonate of lime and a portion of animal matter, probably coagulated albumen. Oyster-shells are employed as antacids; but they do not seem to possess those virtues in any greater degree than carefully prepared chalk. The Oyster, particularly in its raw state, is wholesome and nutritious, and is frequently taken as a light restorative aliment by the feeble and consumptive. The cockle, the mussel, and the snail, are similar in alimentary properties to the Oyster, though greatly

inferior in delicacy and flavour. The mussel, and even the Oyster, in some constitutions, has occasioned the same symptoms as those arising from fish poison. In such cases, emetics, cathartics, particularly castor oil, the vegetable acids properly diluted, and cordials, are the best remedies.

OFF. PREP.—Testæ preparatæ, L.

CLASS VII.—ANNELIDES.

Body soft, more or less elongated, naked or inclosed in a tube, and divided into a number of segments; blood red.

XXIII.

HIRUDO MEDICINALIS.

Medicinal Leech.

Order CRYPTOBRANCHIA, *Cuv.* APODES, *Lam.*

GEN. CHAR. *Body* oblong, slightly depressed, composed of numerous contractile segments, and with the posterior extremity terminated with a broad prehensile disc; *mouth* naked, dilatable, armed interiorly with *three teeth*; *eyes* none; *skin* subcoriaceous.

SPEC. CHAR. *Body* elongated, blackish, with six longitudinal yellow lines, two of which are lateral and interrupted by a series of longish black spots; *abdomen* greenish olive, clouded with black.

Hirudo major et varia; *Gesner, Pisc.* t. 425. Hirudo medicinalis; *Syst. Nat. Gmelin*, i. p. 3095; *Faun. Suec.* 2079; *Muller, Hist. Verm.* p. 19, t. 2, f. 5; *Bergman, Act. Holm.* an. 1757, p. 308, t. 6, f. 1, 2; *Shaw, Nat. Miscell.* vi. t. 218; *Johns. Treat.* p. 30.

Sang Sue, Fr.; *Sanguisuca; Magnatta*, It.; *Sanguijuela*, Sp.; *Blutiul; Ægle*, Ger.; *Kheruheen*, Arab.; *Jonc*, Ind.

This small vermiform *Annelide* has a dark colour and forbidding aspect, and inhabits the stagnant marshes and pools of fresh water throughout Europe. The body is about three inches long, smooth, tapering towards each extremity, composed of numerous rings which are capable of being considerably lengthened or contracted at pleasure. It is of a blackish colour above, with a slight tinge of olive, and is marked by six yellow or buff-coloured longitudinal lines, of which the two exterior ones on each side are interrupted by a chain of longish black spots. The lower surface of the animal is pale olive, variegated with large black or very dark blue irregular spots. Both extremities of the animal are capable of being dilated into a fleshy disc, by means of which it can affix itself firmly to any smooth surface. The mouth is triangular, placed in the centre of a circular or horse-shoe sucker, situated under the head. The mouth is armed with three strong piercers, improperly called teeth, of a rounded form, with sharp cutting edges. They rest on small eminences, and are so placed with regard to each other as to meet in a centre under equal angles. They are confined in their relative situation by a strong circular ligament which surrounds the œsophagus. The teeth of the Leech are powerful enough to penetrate not only through the human skin, but also that of horses and cattle. According to Dr. Johnson the eyes of the medicinal leech are two in number, disposed in the form of a crescent on the pointed extremity at the back part of the head.—Fig. A, represents the internal structure of the Leech, slightly magnified; *a*, the three piercers; *b*, the abdominal blood-vessel; *c*, the lateral vessels; *d*, the male organs of generation; *e*, the testes; *f*, the abdominal vesicles, lying on the surface of the several cells or stomachs; *g*, the lateral vesicles secreting the unctuous fluid for lubricating the surface; B, shews the cocoons of the Leech of their natural size; C, the same cut open; D, the cocoon containing two young Leeches.

It was for a long time the received opinion that the Medicinal Leech was viviparous, excluding its young, like the eel, completely formed; and it is but lately that the contrary fact has been ascertained. Mr. Christopher Hebb, an eminent surgeon in Worcester appears to have been the first who notices distinctly

that the leech is oviparous. He says, "In the month of May I have, from large leeches, seen protruding from the female organ of generation, a white opake oval substance, having a considerable quantity of mucus adhering to it, which I cannot conceive to be excrementitious, but rather an ovum." That this was the real fact there can now be no doubt, since the observations of Mr. Hebb have since been amply confirmed by M. Virey, author of a paper in one of the early volumes of the Journal de Physique, and by Dr. Noble, resident physician at Versailles. The ova or rudiments of the future Leech, are imbedded in a gelatinous mass, and contained in a bag of a spongy texture, somewhat resembling in size and figure the cocoon of the silk-worm. The ova are deposited on, or agglutinated to, aquatic plants, and are hatched by the heat of the sun. M. Planchy, in a Memoir read before the Society of Agriculture and the Arts, in the department of the Seine, asserts that the existence of the cocoons of the Leech has been for a long time known in the department of Finistere. According to this gentleman, it is by means of these cocoons, the leech-dealers of Bretagne, and particularly of Finistere, replenished with Leeches the ponds destined to furnish the metropolis with a great portion of the leeches there employed. About the month of April or May, according to the nature of the season, they send out labourers, provided with spades and baskets, to the ponds and marshes, where they are known to exist in abundance. These workmen then set about removing those portions of mud that are known to contain cocoons, and which are afterwards deposited in sheets of water previously prepared for their reception. Here the young leeches are allowed to quit them, but are, after an interval of six months, withdrawn, for the purpose of being conveyed to larger ponds. Horses and cows are then driven in to feed on the margin of these ponds, with the view of affording the leeches nourishment and accelerating their growth; and in twelve months from this period the leech-dealers begin to collect them for medical use.

Leeches do not cast their skin; but at certain times throw off a tough slimy substance from their bodies, apparently the production of disease. They swim in a serpentine direction, and at times with

considerable velocity. In winter they resort to deep water, or bury themselves to a considerable depth in the mud leaving a small aperture to their subterraneous habitation. Dr. J. R. Johnson, of Bristol, who has written an excellent Treatise on the "Medical and Natural History of the Leech," says they begin to make their appearance in the water about the end of March or the beginning of April. During sunny weather they may be seen very actively swimming from place to place; but should the weather prove cold or cloudy they confine themselves to the mud. In rainy or windy weather, when the water is agitated, they retire from sight. Just before a thunder-storm, they commonly come up to the surface; and this the leech-gatherers find a good opportunity for collecting them. Formerly Norfolk used to supply a great part of the leeches which are brought to the London market, but at present they are imported chiefly from Hamburgh, Bordeaux, and Lisbon. They are caught in spring and autumn by people who wade into the ponds and allow them to fasten on their legs; or by beating the water with poles, which causes the leeches to rise to the surface, when they are taken with the hand and put into bags. They are best preserved in jars half filled with pure water, which must be frequently renewed, and kept in a cool place. But previously to placing the Leeches in this vessel they should be singly examined. If, on being handled, they contract, and feel hard and firm, it affords the best indication of their being healthy; but should they feel flabby, or exhibit protuberances or white ulcerous specks on their surface, they should be kept in jars by themselves.

The food of the Medicinal Leech appears to consist of the blood of quadrupeds and other animals, which they casually meet with in the water, and which, as they are capable of an abstinence of several weeks or even months, they generally find in great abundance. Should it prove otherwise, they are said to subsist by sucking the fluids of fish, frogs, worms, and the larvæ of aquatic insects.

Leeches appear to have been employed for blood-letting for more than two thousand years. We learn from Galen, that the medical utility of leeches was known to Hippocrates: in inflammation of the liver, they were preferred by Aretœus to cupping-glasses; and

they are made frequent mention of in the writings of Dioscorides, Celsus, and Paulus Ægineta. Their medical application is likewise described by Themison, who wrote before Celsus and Galen, in the time of Augustus. He was in the habit of applying a cupping-glass after the Leech had quitted its hold. Pliny, who flourished during the reign of Tiberius, Vespatian, and Titus, speaks of the advantages to be derived from the use of Leeches in cases of gout, and warmly recommends their application, in various diseases, to the hæmorrhoidal veins. The Arabian physicians were well acquainted with the utility of Leeches; and Rhazes, in particular, relates numerous cures which he effected with their assistance. Aretœus recommends the use of Leeches in angina and advises their application to the hips in satyriasis. Orisbasius, who flourished about the year 330, wrote on the advantage of extracting blood by Leeches. Ætius, who lived about the year 445, in his treatise, "De atra Bile sive Melancholia," mentions the successful application of Leeches in inflammation and obstruction of the liver. Paulus Ægineta, who flourished in the early part of the seventh century, points out the method of curing pain in the head, in fevers, by the application of Leeches to the occiput. Arnoldus recommends their speedy application to the wounds inflicted by a rabid animal; and Paracelus used to apply them in cases of jaundice. By the chemical practitioners of medicine, Leeches were not at all employed, because they were accustomed to reprobate all evacuations of blood as useless and hurtful; even Van Helmont would not suffer them to be applied to an hæmorrhoidal swelling. The use of Leeches in the practice of physic appears to have been revived by Senneretus, and Zacutus Lusitanus, who, in nearly all diseases, recommends their application to the vessels of the anus.

Medical Uses.—It would be an almost endless task to enumerate the great variety of medical and surgical cases in which leeches may be employed with advantage. It will be sufficient to observe, indeed, that in all diseases, where the local abstraction of blood is necessary, particularly in inflammatory affections, in topical pains, and in the greater number of tumours, they are preferable to cupping, which is attended with much pain and irri-

tation to the patient, especially when the operation is to be frequently repeated. From the smallness and superficial nature of their wound, the mildness and safety of their operation, and the local nature of the depletion, they are in many inflammatory complaints more convenient and efficacious than the lancet, and much safer in their operation. They are most beneficially employed in inflammations of the eye, the joints, and the testis ; in hæmorrhoidal tumors ; in schirrous swellings of the breast ; in buboes, scrofulous and sympathetic, as well as venereal ; in pneumonia, hepatitis, angina, and every other case of increased vascular action, in which it is essential to diminish the usual impetus of the blood, as in apoplexy.

The best mode of applying leeches, is to take them out of the water for some minutes before they are used, and to dry them well with a very soft cloth, previously to their application. The part should also be well washed with soap and water, and afterwards with water alone, which will be more necessary should any liniment or embrocation have been used. It is the common practice to put as many of them as may be required into a small wine-glass, and to invert it upon the part on which it is intended they shall fix. When they cannot be easily made to bite, the part should be first cooled with a cloth dipped in cold water, or it may be moistened with a little blood, milk, or syrup. When it is wished to apply them very exactly on a particular spot, it will be advisable to put them into a small glass tube, or large quill cut at both ends, and apply the end at which the head of the animal lies to the part, with the finger over the other end, as recommended by Dr. A. T. Thompson, or to puncture the part with a lancet. As soon as the leeches are gorged, they drop off spontaneously ; this usually happens in ten or fifteen minutes ; but they may be separated at any time by sprinkling a little salt on the head. As salt, however, frequently blisters the leech, it has been proposed to empty the animal by regular and uniform pressure ; but though Dr. Johnston considers this plan preferable to the other, he admits that it is scarcely practicable without injuring the external structure of the leech. He says, the best method, and that from which the animal suffers the least inconvenience, is pouring a small quantity

of vinegar upon its head.* When the leeches fall off, the bleeding may be promoted, if necessary, by fomenting the part, or by the application of a large cataplasm of bread or linseed meal. The number of leeches that ought to be applied will vary according to circumstances. As very few leeches can draw more than half a fluid ounce of blood, in the adult, it will be seldom worth while to apply a smaller number than ten or twelve, and the quantity may be increased under particular circumstances to two or three dozen or more.

Dr. Davy, in his History of Ceylon, mentions a species of Leech whose bite is frequently productive of dangerous and even fatal consequences. It is a small animal, not more than half an inch in length, of a brown colour, and marked with three longitudinal pale yellow lines. It is peculiar to those parts of Ceylon which are subject to frequent showers, in mountainous situations. It delights in damp shady places; in dry weather it retires into the close damp jungle, and only in rainy weather quits its cover, and infests the pathways and roads in prodigious numbers. "Whether it is found in any other country than Ceylon is not quite certain; perhaps the Leech of the mountainous parts of Sumatra, noticed in Mr. Marsden's history of that island, is similar to it; and it is not unlikely that it occurs among the damp and wooded hills of the south of India. Those who have had no experience of these animals—of their activity, keen appetite, and love of blood, can have no idea of the kind and extent of annoyance they are to travellers in the interior, of which they may be truly said to be the plague. In rainy weather, it is almost shocking to see the legs of men on a long march thickly beset with them, gorged with blood, and the blood trickling down in streams. It might be supposed, that there would be little difficulty in keeping them off; this is a very mistaken notion, for they crowd to the attack and fasten on quicker than they can be removed. I do not exaggerate when I say, that I have occasionally seen at least fifty on a person at a time. Their bites are much more troublesome than could be

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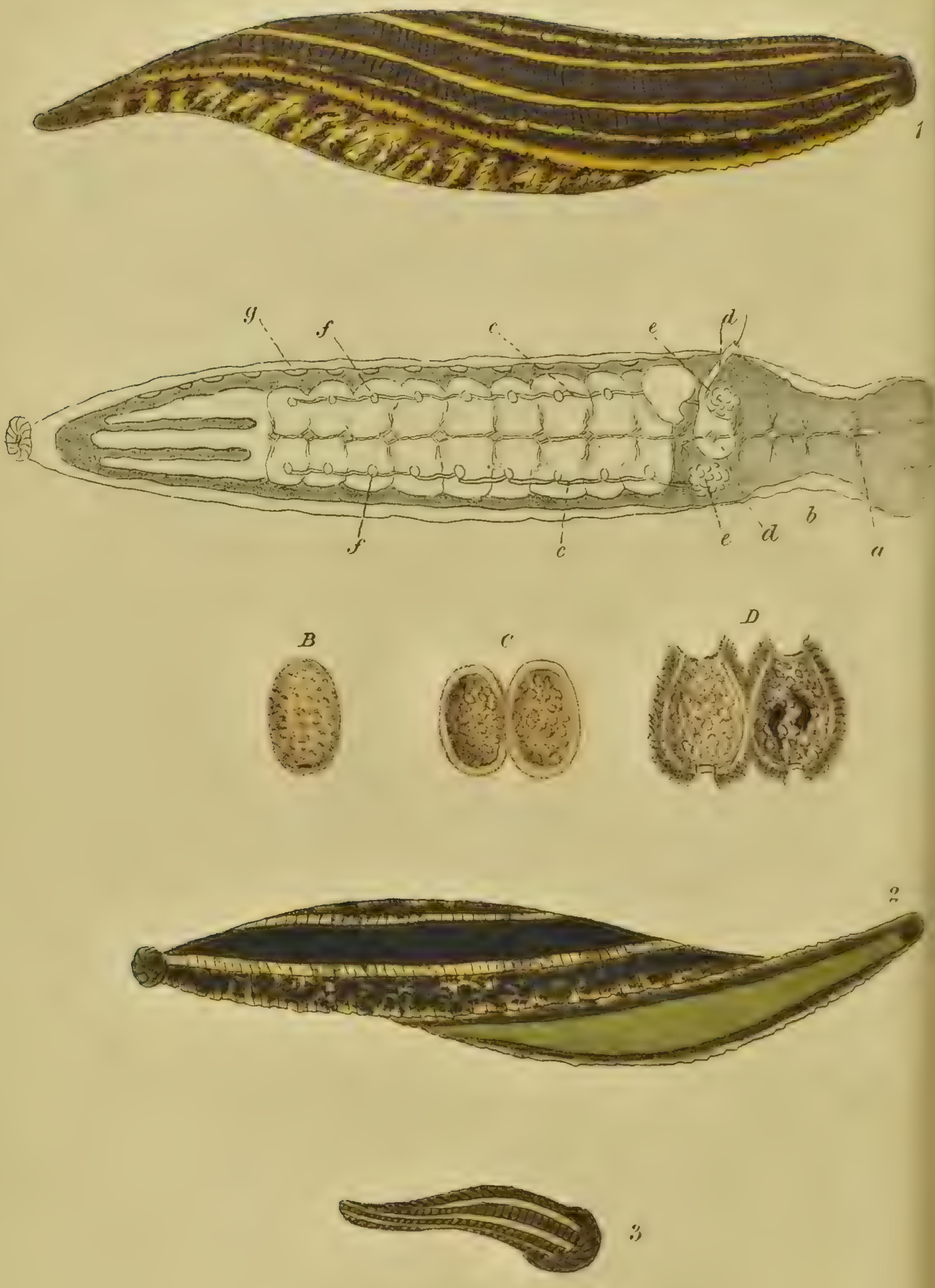
* *Treatise on the Medicinal Leech*, by J. Rawlins Johnston, M. D. F.R.S.



Drawn by Joffroy

Engelmann & Co lith.

1. Hirudo Medicinalis. | 2. Hirudo provincialis.
3. Ceylon Leech.

London: Published by John Wilson, June 1, 1831

imagined, being very apt to fester and become sores; and in persons of a bad habit of body, to degenerate into extensive ulcers, that in too many instances have occasioned the loss of limb, and even of life."

HIRUDO PROVINCIALIS.—*Lisbon Leech.*

Pl. XXIII.

Spec. Char. *Body* olive-green above, with yellow spots; a longitudinal band on the back, green; *sides* yellow; *abdomen* green, with a broad black longitudinal line on either side.

This species inhabits Portugal, and is imported in great quantities from Lisbon, to supply the London market.

HIRUDO TROCHTINA.—*Trout Leech.*

Spec. Char. *Body* elongated, brown above, with yellow rings surrounding the black spots; a yellowish line along the sides; *abdomen* greenish-yellow, with black spots.—*Johns.* p. 32.

Inhabits rivers. It appears to be a new species, and was first described by Dr. Johnston.

HIRUDO SANGUISUGA.—*Horse Leech.*

Spec. Char. *Body* elongated, above brownish-green, beneath greenish, cinereous, with black spots.

Hirudo vulgaris; *Raii Ins.* 3. Hirudo sanguisuga, *Lin. Syst. Nat.* p. 1070.

The Horse Leech inhabits Europe in ponds, and has been vulgarly esteemed poisonous; it seems, however, only to make a larger wound, and its bite is more apt to produce a degree of inflammation which sometimes proves troublesome.

Class VIII.—CRUSTACEA.

Invertebral animals, with a crustaceous or more or less solid covering, provided with articulated members, distinct organs of circulation, and respiring by branchiæ.

XXIV.

POTAMOBIUS FLUVIATILIS.

The Craw-fish.

Order Decapoda, *Latr.* *Family* Astacidæ, *Leach.*

Gen. Char. *Abdomen* with the sides of its segments sharp; middle *tail* lamella bipartite.

Spec. Char. *Rostrum* laterally dentated, the base with one tooth on each side.

Ασακὸς; *Arist. de Anim.* iv. 2. Καρκίνος ποτάμιος; *Diosc.* ii. 12. Astacus; *Plinii, Hist.* Cancer astacus; *Syst. Nat. Gmelin*, p. 2963. Astacus; *Pennant, Brit. Zool.* iv. p. 24, t. 16, f. 1. Astacus fluviatilis; *Fabr. Suppl. Ent. Syst.* 406; *Latr. Gen. Crust. et Insect.* i, 51. Potamobius fluviatilis; *Leach, MSS.*

L'Ecrivisse de Rivière, Fr; *Gambero*, It.; *Cangrejo de rio*, Sp.; *Der Flusskrebs*, Ger.

The Craw-fish inhabits the rivers of Europe, especially such as have a clayey bottom. It is found in many of the rivers in England, forming its holes in their banks. It sometimes, though very rarely, attains the size of a moderately small lobster; more frequently it scarcely exceeds four or five inches in length. The rostrum is projecting and dentated laterally, with one large tooth on each side at the base. The exterior antennæ are simple and longer than the body; the thorax is smooth; as is also the back, with two small spines on each side; the abdomen is flat, with the sides of its segments sharp. The large claws are beset with small tubercles; the two first pair of legs, as Mr. Pennant observes, are clawed; the two next subulated; and the tail consists of five joints, with the lamellæ rounded. The colour, when alive, is olivaceous or dark brown.

In the stomach of this species are found the concretions improperly called crab's eyes. They are generally about the size of peas, whitish or reddish, roundish, of a laminated texture, inodorous and insipid. They consist principally of carbonate of lime, with a small portion of phosphate of lime and animal gelatin. Crab's eyes are said to be procured in the greatest abundance at Astracan, where the Craw-fish are bruised with mallets, and allowed to putrify, after which the stones are picked out and prepared for use by levigation and washing.

Medical Properties and Uses.—These concretions are medicinally employed as an antacid in dyspepsia, diarrhœa, and other diseases attended with acidity of the *primæ viæ*. They are rarely met with genuine, being counterfeited with pipe-clay or chalk, mixed with gelatin. The dose is from one to two drachms.

Off. Prep.—Cancrorum lapilli præparati.

CANCER PAGURUS.

The common Crab.

Gen. Char. *External antennæ* short, inserted between the inner canthus of the eye and the front; *internal*

antennæ placed in foveolæ in the middle of the clypeus; *external double palpi* with the second joint of the internal footstalk notched at the apex; *shell* emarginate behind; *orbits* behind with one fissure, and externally with one fold; *anterior pair of legs* unequal.

Spec. Char. *Shell* granulated with nine folds on each side; *front* with three lobes; *apex* of the hand black.

Cancer pagurus; *Lin. Syst. Gmelin*, i. pars. 5, p. 2973; *Pennant, Brit. Zool.* iv. t. 3. *Crabe pagure*, Fr.; *Il granciporro*, It.; *Der Faschenkrebs*, Ger.

The common Crab is too well known to render any particular description necessary. It is considered to be in season between Christmas and Easter, and about harvest, being much esteemed as an article of food. During the summer months it occurs in great abundance on all our rocky coasts, especially where the water is deep. In the winter they are supposed to burrow in the sand or to retire to the deeper parts of the ocean. They are taken in wicker-baskets or in nets, sunk in the sea and baited with garbage.

Medical Uses.—The tips of the claws and crustaceous covering of the common crab are similar in composition to crab's eyes, and are used for the same purposes.

ARMADILLO VULGARIS.

Common Armadillo, or Pill Millepede.

Pl. XXIV. *fig.* 2.

Order Isopoda. *Family* Oniscides, *Latr.*

Gen. Char. *External antennæ* inserted on a prominence in a cavity on each side of the head; *eyes* late-

Drawn by Joffroy

Engelmann & Co lith

1, Potamobius fluviatilis.
2. Armadillo vulgaris

3. Oniscus Asellus.
4. Scorpio occitanus.

London. Published by John Wilson, June 1, 1831.

ral; *body* elongate, convex, and arched; *tail* with the lateral styles not prominent.

SPEC. CHAR. *Body* cinereous lead-coloured, without spots; hinder margin of the segments whitish.

Ονος; *Diosc.* ii. 37. Multipedes et Oniscus; *Plin.* Porcellio; *Cæl. Aurel.* Oniscus armadillo; *Syst. Nat. Gmelin*, i. 3013; *Cuv. Jour. d'Hist. Nat.* ii. p. 23, t. 26, f. 14, 15. Colporte Armadillo; *Geoffr. Hist. des Ins.* ii. p. 670. Armadillo vulgaris; *Lat. Gen. Crust. et Ins.* i. p. 71.
Armadillo commun, Fr.; *Armadillo*, It. and Sp.

THIS animal is very common throughout Europe, amongst moss and under stones. It is popularly known by the name of Pill-Millepede, and has long been employed as an article of the materia medica. Its general length is rather more than half an inch. The body is elongate-ovate, somewhat convex above, smooth, and consists of ten crustaceous semicircular scales or segments of a cinereous lead colour; the posterior margin of the segments whitish. It is furnished with seven pairs of very short legs, each terminated by a minute horny claw. The antennæ are inserted on a prominence in a cavity on each side of the head. The eyes are minute, lateral; and the styles or appendages to the tail very short. When touched it rolls itself up into a ball, like the singular quadrupeds called Armadillos, frequently remaining in this state for a considerable length of time. Swamerdam relates a ludicrous mistake of a servant maid, who, finding in a garden a great many in a globular form, imagined she had discovered some handsome materials for a necklace, and betook herself to string them with great care; but on suddenly perceiving them unfold, was seized with terror, and ran shrieking into the house.—Fig. (*a*) represents the animal rolled up in a ball; (*b*) the under side.

Millepedes are directed to be prepared by exposing them to the vapour of hot alcohol, till they are killed. They have a faint disagreeable smell, and a somewhat pungent sweetish taste. On analysis they afford an alkalescent fluid, and an inert oil.

MEDICAL PROPERTIES AND USES.—Though no reliance is now placed on their powers, Millepedes once maintained a very respect-

able station in the materia medica, being regarded as expectorant, aperient, and diuretic. They have been highly extolled in humoral asthmas, dropsies, jaundice, and many other diseases. They are usually taken in powder in a dose of one drachm or more thrice a-day, enveloped in syrup; or swallowed alive, like pills, in their contracted state. In very large doses, Dr. Lewis thinks it probable their activity may be considerable;* but Dr. Cullen says he has known a hundred given twice a-day without any sensible action on the kidneys, and without any effect in curing the diseases for which they were prescribed. The Porcellio *scaber*, of Latreille, is used in Scotland for the same purposes, where it is called *sclater*.

ONISCUS ASELLUS.

The Wood-Louse.

PL. XXIV. *fig*. 3.

Order ISOPODA. *Family* ONISCIDES, *Latr.*

GEN. CHAR. *Antennæ* inserted beneath the anterior margin of the head, on a prominent part; *body* oval.

SPEC. CHAR.—*Body* above obscure cinereous, rough; *sides*, and a series of *dorsal* spots, yellowish.

Ονισκος; *Græc.* Πολύπους; *Arist.* v. 30. Asellus, Porcellio, Multipede, Oniscus; *Lat.* Oniscus Asellus; *Syst. Nat. Gmelin*, p. 3013; *Latr. Gen. Crust. et Ins.* i. p. 70. Colporte aselle; *De Geer, Mem. s. l. Ins.* vii. t. 35, f. 3. Oniscus murarius; *Fabr. Suppl. Entom. Syst.* p. 300.

Le Colporte ordinaire ou commun, Fr.

THE Wood-louse inhabits rotten wood and old walls throughout Europe. It is somewhat larger than the preceding, with which it has generally been confounded in the British pharmacopœias. It is about three-fourths of an inch in length; the body is oval, with

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* *Treatise on the Materia Medica*, p. 385.

crustaceous imbricate segments, rough above, and of a livid brown or dirty ash-colour. The larger specimens are generally marked with a double series of pale yellow spots down the back; the sides are yellowish, and the belly nearly white. The body is not capable of contracting into a ball, and the tail is furnished with two prominent lateral styles, by which characters it may at once be distinguished from the Oniscus *armadillo*.

The learned Bonnet relates, that a young woman who had swallowed these animals alive, as is usually done, threw up a prodigious number of them of all sizes, which must have bred in her stomach.* The Oniscus *Asellus* is popularly named Sow-bug, Church-louse, Pig's-louse, Wood-louse, or Carpenter.

Class IX.—ARACHNIDES.

Oviparous animals, with articulated members, and not undergoing a metamorphosis; respiration tracheal or brachial, the openings for the admission of the air stigmatiform; antennæ none.

SCORPIO OCCITANUS.

Yellow Scorpion.

Pl. XXIV. *fig*. 4.

Order Pulmonaria. *Family* Scorpionides, *Latr.*

Gen. Char. *Hands* with the last joints thickest, and in the form of forceps; *maxillæ* short, rounded, somewhat arched, and hairy; *eyes* six or eight; *body* oblong, divided into many segments, with two laminated

* Bonnet *Œuvres*, v. 144.

plates *(pectens)* at the under base of the abdomen; *tail* composed of six joints terminated in an arched sting.

* *Eyes eight in number.*

SPEC. CHAR. *Pecten* with twenty-eight teeth; *body* yellowish; *tail* longer than the body, with elevated granular lines; *hands* ovate, smooth; *last joint* of the tail globose; no prominence under the sting.

Scorpio occitanus; *Amoreux, Jour. de Phys.* i. an. 1789; *Latr. Gen. Crust. et Ins.* i. 132; *Herbst. Natur. Skorp.* t. 3, f. 3. Scorpio tunetanus; *Redi, de Gen. Ins.* Scorpio; *Maupert, Mem. de l'Acad. des Scienc.* an 1731, t. 16, f. 3. Buthus occitanus; *Leach, Nat. Misc.* iii. t. 143.

THIS is the animal with whose poison Redi and Maupertius made their experiments. It is rather a small species, of a pale yellowish colour, and is very common in Spain, under stones, in warm sandy mountainous situations. The body is oblong, ovate, about an inch and a half in length, and divided into six or seven segments; on the under side of the base of the abdomen are two laminated plates, resembling the tooth of a comb, and furnished with twenty-eight teeth. The legs are eight in number, slightly hairy underneath, and terminated by two small curved claws. Besides the legs, in common with the rest of the genus, it has two chelæ, or hands, situated on each side of the anterior part of the head, each composed of four joints, the last of which is larger than the others, ovate, smooth, and in the form of a forceps. The maxillæ are short, rounded, internally somewhat arched, and hairy. The eyes are eight in number. The thorax is as broad as the abdomen, somewhat cordate, and marked above with granular lines; the tail is composed of six joints, the last globular, ampullacious, very smooth, and armed with a simple incurved mucro or sting, instilling a poisonous fluid into the wound it inflicts.

Scorpions feed on worms, spiders, small insects, and even on one another. All the species are natives of warmer climates than our own, concealing themselves under stones, or furniture in

houses, and shunning the light. They run quickly, bending their tail in the form of an arch over their back. They are ovo-viviparous, the body of the pregnant female exhibiting, when dissected, between forty and fifty young. Each of these exist in the ovaries at first as eggs, but are hatched within the body of the mother, and come out in the larva state. The larvæ and pupæ are eight-legged, extremely active, and resemble the perfect insect. The young, when first excluded from the parent, are entirely white, but acquire their dusky colour in the space of a few days. From the observations of Maupertuis and others, it appears that these animals cast their skins, at certain periods, in the manner of spiders.

The poison of the Scorpion is evacuated through three small foramina near the tip of the sting. 'It is well known,' says Dr. Shaw, 'that a diversity of opinion has prevailed amongst authors relative to the slit or foramen in the fangs of spiders, through which their poison is evacuated. The same contrariety of sentiment takes place with respect to such a foramen in the scorpion's sting. The celebrated Redi, assisted by the best microscope he could procure, was not able to discover it; though he was well convinced of its existence from perceiving the minute drop of poison exude from near the tip of the sting. Others have denied the existence of the foramen; but Valisneri and Leewenhoek have both described two foramina, viz. one on each side of the tip, and which are of the shape inclining to triangular; besides these, a third foramen has sometimes been seen; so that the sting of the scorpion can with greater facility discharge its venom than that of any other animal. Several fabulous anecdotes of the scorpion,' continues this popular writer, 'have been recorded by the older authors on natural history, which are totally unworthy of being related in the present enlightened age. One of the most remarkable of these legends is, that a scorpion surrounded by live coals, finding no method to escape, grows desperate from its situation, and stings itself to death. It is not,' he observes, 'uncommon to hear this quoted with serious credulity as the only instance of suicide amongst the inferior animals.'

The poison of scorpions, though much more active, is said to resemble that of bees and wasps in many of its chemical qualities. It is discharged from the pores of the sting, where, when the

animal is irritated, it accumulates, in the form of two or three little drops of a whitish colour. When spread on paper it produced a spot like that which would be caused by oil, and this part of the paper by dessication becomes firmer and transparent.

All the species of this genus are capable of stinging in a greater or less degree; but according to Maupertuis and Redi, the full effect of the venom seems only to be felt when the powers of the animal have not been for a long time exerted. The European species are scarcely in any instance capable of inflicting a dangerous wound. In some parts of Italy and the south of France, instances frequently occur of their sting causing violent local inflammation, acute pain, and fever, on man; but their malignityin Europe is trifling when compared to what the natives of Africa and the East are known to experience. In Batavia, where they grow to an enormous size, there is no removing any piece of furniture without the utmost danger of being stung by them. Bosman assures us that along the Gold coast, they are often found larger than an ordinary sized lobster; and that their sting is inevitably fatal. The only means of saving the lives of our soldiers who were stung by them in Egypt, was amputation. One species is said to occasion madness; and the black scorpion both of South America and Ceylon, frequently inflicts a mortal wound.* The remedies are the same as those already advised against the bites of venomous serpents. The oil in which scorpions had been infused was formerly applied, as a remedy, to the wounded part. Fomentations and emollient cataplasms have been found useful; but Dr. Parr justly observes, " as the wound is seldom dangerous, many remedies have obtained unmerited credit."

SCORPIO AFER.—*Indian Scorpion.*

Spec. Char. *Pectens* with thirteen teeth; *body* blackish-brown, with the joints of the feet and

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* Ulloa's *Voy.* i. 61, 62.

antennæ whitish; *hands* subcordate, scabrous and hairy.

Scorpio afer; *Lin. Fabr.*; *Seba*, i. t. 70, f. 1-4; *Rœsel*, iii. t. 65; *Herbst.* t. 1; *Shaw*, *Nat. Misc.* iii. t. 109.

INHABITS India, Persia, and some parts of Africa. It is by far the largest and most formidable of the scorpion tribe, measuring eight or ten inches from the tip of the hands to the extremity of the tail. The prevailing colour is a deep glossy brown, approaching in some specimens to black. It is much dreaded in Africa, where the activity of the poison is frequently productive of serious evils, and where the wound has been neglected, the consequences have been fatal. Lichtenstein, in his Travels in Southern Africa, says, in warm nights there is a very great danger of being stung by them, and relates, that a few weeks before his arrival at the Cape, a melancholy proof had been given of the dangerous nature of their poison. One of the slaves of a Mr. Van Wyk, when she was busied in collecting dry wood, had the misfortune to be stung in the hand by one, which was probably concealed under the bark of the oldest and driest pieces. All the usual remedies were immediately applied, but the girl, notwithstanding, died in eighteen hours. During the cold weather this dangerous animal seldom comes abroad, and loses in some degree the power of darting its sting, so that the wound is less dangerous.

SCORPIO AMERICANUS.—*American Scorpion.*

SPEC. CHAR. *Pecten* with fourteen teeth; *hands* somewhat ciliated; *fingers* filiform.

Scorpio Americanus; *Lin.*; *Roesel*, *Ins.* iii. t. 66, f. 5. Scorpion tachete; *De Geer*, *Mem. Ins.* vii. t. 61, f. 9 et 10; *Herbst.* t. 6, f. 3.

INHABITS South America; and is very common at Sierra Leone, in Africa.

SCORPIO AUSTRALIS.—*African Scorpion.*

Spec. Char. *Pecten* with thirty-two teeth ; *hands* smooth, elongated and red ; *claws* filiform ; under the sting a pointed process.

Scorpio Australis ; *Lin. Fabr.*; *Herbst.* t. 6, f. 1.

This species inhabits Africa. The body is brown ; the legs are reddish ; the hands long, smooth, rufous, and furnished with filiform claws.

SCORPIO CARPATHICUS.—*Carpathian Scorpion.*

Spec. Char. *Pecten* with eighteen teeth ; *hands* angular ; *tail* mucronated beneath the sting.

** *Eyes six in number.*

Scorpio Europæus, *Lin. Fabr.* S. Carpathicus, *Latr.* S. Germanicus, *Herbst.*

Habitat unknown ; but Latreille says it is an extra-European species.

SCORPIO EUROPÆUS.—*European Scorpion.*

Spec. Char. *Pectens* with nine teeth ; *hands* somewhat heart-shaped, angular ; *wrists* unidentate ; *body* obscure brown ; *legs* and *last joint of the tail* brownish yellow.

Scorpio Europæus ; *Latr. Gen. Crust. et Ins.* i. p. 131 ; *Villers, Entom.* iv. t. 2. f. 11.

This species inhabits the south of Europe, and is common in many parts of Italy, in neglected places under stones, and in houses. It is of an obscure brown colour, and usually measures somewhat more than an inch in length, from the head to the setting on of the tail. Its sting is painful, producing considerable inflammation

Pl. 23

1. Scolopendra morsitans *2. Lycosa Tarentula.*

3. Phthirius inguinalis.

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and swelling, but seldom productive of any very serious consequences. It appears to have been unknown to Linneus, who has described some other species for it, and has led the celebrated Fabricius into a similar error respecting it. De Geer has described a Cayenne species for *Europæus*.

SCORPIO MAURUS.—*Barbary Scorpion.*

Spec. Char. *Pectens* with eight or ten teeth; *hands* cordate, nearly smooth; *body* fuscous and granulated.

Scorpio maurus; *Lin. Fabr. Latr.*; *Herbst. Scorp.* t. 6, f. 4.

Inhabits Barbary.

LYCOSA TARENTULA,

Common Tarentula.

Pl. XXV. *fig.* 2.

Order Pulmonaria. *Family* Citigradæ, *Latr.*

Gen. Char. *Maxillæ* straight, anteriorly convex, exteriorly somewhat arcuated; *apex* obliquely truncated, forming almost an inverted triangle; *lip* elongate, quadrate; *feet* strong, the fourth pair longest; *eyes* quadrilateral.

Spec. Char. *Body* above greyish-brown; *mandibles* and *palpi* ferruginous, with their tips black; *abdomen* bright yellow, with triagonal spots anteriorly; *thighs* and *tibiæ* below reddish-white, with two black spots.

Aranea tarentula; *Lin. Syst. Nat.* ed. 13, i. p. 1035; *Fabr. Entom. Syst.* ii. p. 425; *Rœm. Gen. Ins.* t. 30, f. 1. Lycosa tarentula; *Latr. Gen. Crust.* i. p. 119; *Walck. Tab. des Aran.* p. 11.

La Tarentule, l'araignée enragée, Fr.; *La Tarantola*, It; *Die Tarantel*, Ger.; *Tarantel*, Dan. and Swed.; *Misgir*, Russ.

This species is the famous Tarentula Spider of which such marvellous accounts have been given by travellers, who have described its bite as generally fatal, and to be curable only by music. It is a native of the south of Europe, and is generally found during winter in a deep hole, formed in the declivity of small hillocks; but in the summer it keeps in the air, and spins its web. It is one of the largest of the European spiders; the upper part of the body is of a greyish-brown colour; the mandibles and middle of the palpi ferruginous; the margin of the thorax is grey with a radiated dorsal line of the same colour. The anterior part of the dorsum of the abdomen is marked with triagonal spots, hinder part with bent transverse black strigæ margined with white; the belly is of a fine deep saffron colour, with a transverse black band; the thighs and tibiæ below yellowish white, with two black spots. The figure of the Tarentula and of the following species (*Galeodes araneoides*) were drawn from specimens in the collection of the British Museum.

The name Tarentula is derived from Tarentum (now Taranto), in the kingdom of Naples, near which place they were supposed to be found in the greatest plenty. The Lycosa *Tarentula Narbonensis*, of Walcknaer, (*Aranea Tarentula*, Oliv.) is much smaller than the present species, and the abdomen is black, with a saffron-coloured anus.

The effects ascribed to the bite of this animal, and their cure by music and dancing till a profuse perspiration is produced, is now no longer believed. Dr. Serao, an Italian physician, has written an ingenious work in which he has completely exploded this opinion as a popular error; and Dr. Cirillo, professor of Natural History in Naples, found, on experiment, that the only symptoms which followed the wound of the Tarentula was a trifling inflammation of the part, similar to that produced by the sting of the common scorpion. Dr. Clavitio submitted to be bitten by this animal, and no bad effects ensued; and the Count de Borch, a Polish nobleman, bribed a man to undergo the same experiment, in whom the only symptom was a swelling in the hand, attended by intolerable itching.

Drawn by Joffroy

Printed by Engelmann & Co.

1. *Galeodes araneoides* 2. *Cantharis vesicatoria.*
3. *Cantharis cinerea.* 4. *Cantharis vittata.*
5. *Myabris cichorei.*

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GALEODES ARANEOIDES.

Venomous Galeoides.

PL. XXVI. *fig.* 1.

Order TRACHEARIÆ. *Family* PSEUDOSCORPIONES. *Latr.*

GEN. CHAR. *Body* oblong; *mandibles* very large, nearly conical and pointed, each with two claws or scaly teeth; *palpi* filiform, of five joints; *eyes* four; *abdomen* oblong, pubescent; *feet* with long hairs.

SPEC. CHAR. *Body* pale yellow, mixed with ash-grey; *extremity of the claws* brown.

Phalangium araneoides; *Pallas, Spic. Zool. fasc.* ix. t. 3. Solpuga araneoides; *Fabr. Suppl. Ent. Syst.* 294. Sulpuga arachnoides; *Herbst. Naturg. Solp.* t. 1, f. 2. Galeodes araneoides; *Latr. Gen. Crust. et Ins.* i. 135.

ANOTHER very noxious animal allied to the scorpion, although destitute of a sting, is the Galeodes *araneoides,* the bite of which is said to be extremely dangerous, and even mortal. It inhabits the Cape of Good Hope, and occurs also in some parts of Russia and the Levant. It is about an inch and a half long; the body is oblong, soft, villose, and of a pale yellow colour mixed with ash-grey. The mouth is furnished with two very large nearly conical pointed mandibles; the palpi are filiform, five-jointed, and thickly beset with elongated hairs resembling spines; the thorax is covered with a hard scutum of a triangular shape, on which the eyes are placed. The feet are elongate and filiform, beset with long hairs, and armed at their points with horny nails of a brown colour.

Besides the species already described, there are some others which are represented to be as dangerous as the viper. Thus M. Thiébaut de Berneaud, in his Voyage to Elba, notices a spider (Theridium 13-*guttatum*) that, in the Volterrao, frequently inflicts a fatal

wound. And Mr. Jackson affirms that a spider called the *Tendaraman,* is found in Morocco, which has venomous powers equally formidable. Ulloa gives an account of a spider of a bright red colour, common in Popayan, called *Coya* or *Coyba,* and usually found in corners of walls and among the herbage, the venom of which is of such malignity that if applied to the skin of either man or beast, it immediately causes large tumours, which are soon succeeded by death. The only remedy which the natives employ for counteracting the ill effects of the poison is, on the first appearance of the swelling, to swing the patient over the flame of straw or long grass; after this operation he is reckoned to be out of danger.*

Class X.—MYRIAPODA.

Head distinct, with two antennæ; mandibles simple incisive; feet on all or most of the segments of the body.

SCOLOPENDRA MORSITANS.

Venomous or Biting Centipede.

Pl. XXV. *fig.* 1.

Order Chilopoda. *Family* Æquipedes. *Latr.*

Gen. Char. *Antennæ* conico-setaceous, of many subconic joints; *mouth* covered with hemispheric galeæ; *exterior palpi* with a double peduncle; *mandibles* strong, horny; *upper lip* divided by a fissure; *body* with the segments margined; *anterior pair of feet* small, the last pair largest; *eyes* eight, four on each side of the head, arranged in a rhomboidal form.

* Ulloa's *Voyage*, b. vi. c. 3.

* *Body with the segments elongate or sub-elongate, irregular.*

Spec. Char. *Body* yellowish-brown; *feet* forty-two, the last two with the first joint spinulose on the internal side.

Scolopendra morsitans; *Lin. Syst. Nat.* i. p. 1062; *Latr. Gen. Crust. et Ins.* i. p. 78; *Fabr. Entom. Syst.* ii. p. 390. Scolopendre mordante; *De Geer, Mem. s. l. Ins.* vii. p. 563, t. 43, f. 1; *Ræm. Gen. Ins.* t. 30, f. 14.

Many species of this genus have been described by naturalists. The larger kinds, found only in warm climates, where they are known under the denomination of *Centipede*, are animals of a very formidable appearance, and viewed with general disgust. They are armed with strong horny jaws, furnished, like the sting of the scorpion, with a small orifice, visible under a common lens, from which a poisonous fluid issues, capable of producing violent local inflammation, fever, and even death. The species here represented, which is the most common, being found in great abundance in many parts of Asia, Africa, and America, may serve to illustrate the genus. It varies exceedingly in size and colour; its usual length is nine or ten inches, but individuals sometimes occur of much larger dimensions. It is of a yellowish-brown colour, frequently tinged with red, the legs and under surface of the body being much paler. The head is armed with very large strong horny curved jaws or mandibles, which move horizontally when the animal bites. The antennæ are more than twice as long as the first segment covering the head, setaceous, and composed of several articulations, which are nearly conical. The eyes are eight in number, four on either side, very small, and placed in a rhomboidal form. The segments of the body are numerous, oblong-square, smooth, shining, and slightly marginated. The feet are forty-two in number, every segment of the body bearing one pair, which terminate in very sharp hooks or claws of a shining black colour. The last pair of legs are considerably longer than the others, and spinous at their base, on the internal side.—Fig. (*a*) represents

the head of the Scolopendra Morsitans, subface; (*c*) front view of the same, to shew the mouth; (*b*) the four eyes on one side of the head.

De Geer, Catesby, and other authors, assert that the bite of the Scolopendra seldom proves fatal to man and the larger animals; though not mortal, its wounds are more painful than those produced by the sting of the scorpion.

SCOLOPENDRA GIGAS.—*Gigantic Scolopendra.*

** *Body with the segments nearly equal.*

Spec. Char. *Segments* transversely quadrate, with rounded angles, ferruginous brown, luteous behind; *antennæ*, *palpi*, *galeæ*, and *legs* testaceous; all the *feet*, with the exception of the anterior pair, with small spines on their joints.

Described by Dr. Leach in the eleventh volume of the Transactions of the Linnean Society, from a specimen in the College Museum of Edinburgh. Length eleven inches. Locality unknown.

SCOLOPENDRA ALTERNANS. *Alternate Centipede.*

*** *Segments transverse, alternately longer and shorter.*

Spec. Char. *Hinder legs* with the first joint rounded and internally spinulose.

Scolopendra alternans; *Leach, Lin. Trans.* xi. 383; *Zool. Miscel.* iii. t. 138.

Habitat unknown.

CLASS XI.—INSECTA. *(Insects.)*

Articulated animals with six legs, respiring by means of tracheæ; head distinct from the thorax; antennæ two.

PHTHIRUS INGUINALIS.

Crab-Louse.

PL. XXV. *fig.* 3.

Order PARASITA. *Family* SIPHUNCULATA. *Latr.*

GEN. CHAR. *Anterior pair of feet* simple, two hinder pair didactyle; *thorax* extremely short, scarcely visible.

SPEC. CHAR. *Body* whitish.

Pediculis pubis; *Lin. Syst.* i. p. 1017. Le Morpion; *Geoff. Hist. des Ins.* ii. p. 597. Pou du Pubis; *Latr. Hist. des Crust.* viii. p. 94; *Redi, Exper.* t. 19, f. 1. *Le Morpion*, Fr.; *Piattola*, It.; *Ladilla*, Sp.; *Piolho ladro*, Port.; *Die Filzlaus*, *lattlaus*, Ger.; *Flatlus*, Swed.; *Plotschiza*, Russ.

THIS disgusting parasite inhabits the eye-brows, pubes, &c. of men and women, and is distinguished by the cheliform structure of its legs, whence its name of Crab-louse. It is a frequent cause of local prurigo; for these animals perforate the cuticle, and stick so close that they can with difficulty be dislodged. They are chiefly discoverable by their nits, which may be seen attached to the basis of the hairs, the insects themselves appearing only like discolourations of the skin. They are furnished, like the rest of the family Pediculidæ, with a mouth consisting of a tubulose very short haustellum, but they have no mandibles, properly so called. The body is flattish, more round than the common louse, with a shorter thorax, and the hinder pair of feet didactyle and very strong.

It is almost an established fact that every species of bird, and probably mammiferous animal, has its own peculiar parasite, and many have several. Man affords a nidus and subsistence to three distinct species. Two other species besides the Crab-louse, the Pediculus *humanus*, of authors, and the Pediculus *cervicalis*, of Latreille, are well known to infest the human body. The latter inhabits the heads of man and upper part of the necks of children, throughout Europe, and is distinguished by its oval lobed cinereous body, marked with an interrupted band on either side. It deposits single nits or eggs in the hairs of the head, and does not spontaneously quit the scalp or its natural covering. The latter, which is white and nearly immaculate, seldom appears on the head, but resides on the trunk of the body and on the garments, and is known by the name of the body-louse. The nits are conglomerate, and usually deposited on the folds of linen and other articles of dress. On the continent of Europe, especially in Spain and Portugal, this species is very common. In Britain it is of rare occurrence, and is conjectured to have been introduced from the neighbouring countries. Both these species subsist on the blood of man, which they suck with their proboscis; but they abound chiefly among the inhabitants of sordid dwellings, or jails and workhouses, and in such situations prey upon all persons indiscriminately. There is, however, a peculiar state of the skin of people advanced in life, and connected with the disease, which has been denominated *prurigo senilis* by Dr. Willan, in which they are generated notwithstanding every attention to cleanliness, and multiply so rapidly that the patient endures extreme distress from their perpetual irritation. It does not appear, from any well ascertained fact, that the species belonging to this genus are ever subcutaneous. Many marvellous stories, indeed, are related by Forrestus, Schenkius, and others, respecting lice bred under the skin, and discharged from abscesses, strumous ulcers, and vesications, and many individuals of great note are said to have died in ancient times from the multitude of these pediculi. Thus we are told that among the ancients, Scilla the dictator, Alcmæon the poet, Pherecydes Sirius the philosopher, Callisthenes the Olympian, during the time of his imprisonment, Mutius the lawyer, Eunus the slave, the

two Herods, and, by some, Plato, died of this disease.* In more modern times, the great persecutor of the Protestants, Philip II. is said to have been carried off by it; and Amatus Lusitanus has described two cases of Phthiriasis, one of which terminated fatally.† From the habits of the genus Pediculus, and the mode in which they are generated, it is justly remarked by Dr. Willan that no credit can be given to these accounts, and that the disease produced by animals residing under the cuticle must have been occasioned by some other insect.

According to Messrs. Kirby and Spence, in their valuable Introduction to Entomology, at least three different species of insects have been observed to attack the human body, in the various cases that have been recorded under the common name of *Phthiriasis.* These three kinds of insects are lice, (*Pediculi,* L.) mites (*Acari,* L.) and *Larvæ* or grubs in general.

Acari, or mites, appear to be a frequent source of disease in the human body, both local and general. They are distinguished from Pediculi, not only by their form, but also often by their situation, since they frequently establish themselves under the cuticle. Dr. Adams conjectures that Acari may be the cause of certain cases of Ophthalmia; and Sir Joseph Banks, in a letter to that gentleman, relates that some seamen belonging to the *Endeavour* brig, being tormented with a severe itching round the margin of the eyelids, one of them was cured by an Otaheitan woman, who, with two small splinters of bamboo, extracted from between the cilia abundance of very minute lice.‡ Le Jeune, a French physician, quoted by Mouffet,§ describes a case in which these insects infested the white of the eye, exciting an intolerable itching; and Dr. Mead, in the German Ephemerides, gives an account of a woman suckling a child, from whose breast proceeded very minute insects. These are supposed by Mr. Kirby to have been mites, and perhaps that species which, from its feeding upon milk, Linneus denominates

* See Plutarch's *Life of Sylla;* also, Plin. *Hist. Nat.* lib. xxvi. cap. 13.

† *Amat. Lusit. Contur.* iii. cur. 58. See also Forrestus, *Obs. Med.* lib. viii. obs. 14. Joan. Schenck. *Obs. Med.* lib. v. obs. 2.

‡ *On Morbid Poisons,* 306, 307.

§ *Insectorum sive minimorum animalium theatrum,* p. 267.

Acarus Lactis. Linneus supposes many contagions are caused by mites, particularly dysentery and the itch. That the latter is occasioned by a species of mite is not a doctrine peculiar to the moderns. "Mouffet mentions Abinzoar, called also Avenzoar, a celebrated Hispano-Arabian physician of Seville, who flourished in the twelfth century, as the most ancient author that notices it. He calls these mites little lice that creep under the skin of the hands, legs, and feet, exciting pustules full of fluid.* Joubert, quoted by the same author, describes them under the name of *Sirones,* as always being concealed beneath the epidermis, under which they creep like moles, gnawing it, and causing a most troblesome itching. It appears that Mouffet, or whoever was the author of that part of the *Theatrum Insectorum,* was himself also well acquainted with these animals, since he remarks that their habitation is not in the pustule but near it; a remark afterwards confirmed by Linné, and more recently by Dr. Adams.† In common with the former of these authors, Mouffet further notices the effect of warmth upon them in exciting motion. Our intelligent countryman also observes that they cannot be Pediculi, since they live under the cuticle, which lice never do.

"In more modern times, microscopical figures have been added to descriptions of the insect. Bonomo first furnished this valuable species of elucidation. His figures, however, which are copied by Baker in his work on the microscope, are far from accurate.‡ Those of De Geer and Dr. Adams are much more satisfactory, and mutually confirm each other.§ From them it is evident that the same insect inhabits the scabies of Sweden and Madeira. Dr. Bateman, in the letter before alluded to, informs his correspondent, that he had seen that from Madeira, and gives it as his opinion that there cannot be a doubt of the existence of an *Acarus Scabiei*; an opinion which he repeats in his late work on *Cutaneous Diseases*; and which, according to Hermann,‖ has been also rendered un-

* Mouffet, 266. † *Observations,* &c. 296.

‡ *Osservazioni intorno à pellicelli del corpo umano fatte dal Dottor* Gio Cosimo Bonomo, &c. f. 1-3. Baker, *On Microsc.* i. t. 13, f. 2.

§ De Geer, vii. t. 5, f. 12, 14. ‖ *Mem. Apterologique,* 79.

questionable by Wichmann in his *Etiologie de la Gale* (Hanovre 1786), a work I have not had an opportunity of consulting. From all this we may regard the point as so far settled, that an animal of this kind exists at least as an occasional concomitant of scabies.

"This fact being ascertained, a more complex inquiry remains, which branches out into two distinct questions. Is scabies always produced by these insects? Or, if this be not the case, Is the *animate* scabies a distinct disease from the *inanimate?*

"It is very remarkable that Linné, a physician as well as a naturalist; and De Geer, one of the most accurate observers that ever existed; should both assign the insect in question as the undoubted cause of the *common* scabies of their country; the one applying to the disease he was speaking of the epithet of *communissima,* and observing the fact to be notorious, (*cuique liquet*), and the other designating it by the well known French name "*La Gale.**" And is it not equally remarkable that such men as John Hunter, Dr. Heberden, Dr. Bateman, Dr. Adams, and Mr. Baker, should never, in this country, have been able to meet with it? Did it indeed exist in our common scabies, it seems impossible that it could have escaped the observation of the two last of these gentlemen; Dr. Adams being so well qualified to detect it from his observations in Madeira, and Mr. Baker from his expertness in microscopical researches. Dr. Bateman, in the letter above quoted, says, "I have hunted it with a good magnifier, in many cases of itch, both in and near the pustules, and in the red streaks or furrows, but always without success." In his work on *Cutaneous Diseases* he tells us, however, that he has seen it, in one instance, when it had been taken from the diseased surface by another practitioner. And though Dr. Willan in his book speaks of the Acarus as the concomitant of the disease, yet his learned friend just mentioned observes, that he admitted that it was not to be found in ordinary cases, and indeed never seemed to have made up his mind upon the subject. When I was at Norwich in 1812, Dr. Reeve very

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* I am informed by my learned friend Alexander MacLeay, Esq. late Secretary to the Linnean Society, that, in the north of Scotland, the insect of the itch is well known, and easily discovered and extracted.

insects. A decoction of the seeds of stavesacre, of black pepper, kindly accompanied me to the House of Industry there, to examine a patient whose body was very full of the pustules of this disorder; but though we used a good magnifier, we could discover nothing like an insect. I must observe, however, that our examination was made in December, in severe weather, when the cold might perhaps render the animal torpid, and less easy to be discovered.

"From the above facts it seems fair to infer that this animal is not invariably the cause of scabies, but that there are cases with which it has no connexion. Now, from this inference, would not another also follow, that the disease produced by the insect is specifically distinct from that in which it cannot be found? Sauvages and Dr. Adams are both of this opinion, the former assigning it to the trivial name of *vermicularis;* and the latter proving, by very satisfactory arguments, that it is different from the other. If they were both *animate* diseases, but derived from two distinct species of animals, (for it seems not impossible that even our common itch may be caused by a bite more minute than the other, and so more difficult to find), they would properly be considered as distinct species; much more, therefore, if one be *animate* and the other *inanimate.* Nay this, I should think, would lead to a doubt whether even their *genus* were the same. I shall dismiss this part of my subject with the mention of a discovery of Dr. Adams, which seems to have escaped both Linné and De Geer—that the *Acarus Scabiei* is endowed with the faculty of leaping; (in this respect resembling the insect found by Willan in *Prurigo senilis,*) for which purpose its four posterior thighs are incrassated.*

"I shall now produce two instances where mites were evidently concerned. Dr. Mead, from the *German Ephemerides,* relates the miserable case of a French nobleman, from whose eyes, nostrils, mouth, and urinary passage, animalcules of a red colour, and excessively minute, broke forth day and night, attended by the most horrible and excruciating pains, and at length occasioned his death. The account further says, that they were produced from

* It may be mentioned here as a remarkable fact, that the *Acarus Scabiei* was discovered by M. Latreille upon a New Holland quadruped (*Phascolomys fusca,* Geoffr.) of the Marsupian tribe. *N. Dict. d'Hist. Nat.* xxi. 222.

his corrupted blood. This was probably a fancy originating in their red colour: but the whole history, whether we consider the size and colour of the animals, or the places from which they issue, is inapplicable to *larvæ* or maggots, and agrees very well with *mites*, some of which, particularly *Leptus autumnalis*, are of a bright red colour. The other case, and a very similar one, is that recorded by Mouffet of Lady Penruddock; concerning whom he expressly tells us, that Acari swarmed in every part of the body— her head, eyes, nose, lips, gums, the soles of her feet, &c., tormenting her day and night, till, in spite of every remedy, all the flesh of her body being consumed, she was at length relieved by death from this terrible state of suffering. Mouffet attributes her disease to the *Acarus Scabiei*; but from the symptoms and fatal result it seems to have been a different and much more terrific animal. He supposes, in this instance, the insect to have been generated by drinking goat's milk too copiously. This, if correct, would lead to a conjecture that it might have been the *A. Lactis*, L."*

In warm countries, the flies are so numerous about the persons of the sick that the utmost care is requisite to prevent the generation of larvæ from the eggs, which they deposit not only in wounds and abscesses, but in the nostrils, mouth, &c., sometimes penetrating to the brain itself, and causing death.† In the same way maggots are sometimes bred in the patches of cutaneous eruptions, as described by Professor Murray of Gottingen, in a case of leprosy.‡ Swediaur once saw a young woman, thirty years of age, in the Westminster Infirmary, who was covered with minute pustules and tubercles, swarming with *animaculæ* over the whole body.§

The generation of lice, in connection with *Prurigo senilis*, though not fatal, is frequently a very troublesome and obstinate malady; and a great many external applications have been resorted to from ancient times to destroy these loathsome and irritating

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* *Introduction to Entomology*, v. i. p. 97.

† See Dr. Lemprière's *Observations on the Diseases of the Army in Jamaica*, vol. ii. p. 182.

‡ *Obs. de Verm. in Lepra obviis*, p. 25.

§ *Nov. Nosol. Meth. Syst.* ii. 233.

of rue, laurel, tobacco, and veratrum album, or the powder of any of these substances mixed with lard, in the form of an ointment, have been recommended as very effectual destroyers of the pediculi of the head, and even of the body lice. Calomel, or the red oxide of mercury mixed with starch powder, sprinkled amongst the hair, or applied by means of a down puff, is equally efficacious. To the *phthirus inguinalis,* or crab-louse, as to all other species of insects, the mercurial oxides are the most fatal poisons. Two or three applications of the strong mercurial ointment, assiduously made, is usually sufficient to effect a cure. As its external use, though very efficacious, is attended with much inconvenience from the dirtiness of its application, other preparations of mercury are frequently substituted. The most efficacious of these are the white precipitated oxide of mercury, white hellebore ointment, and calomel. The oil of spike, as it has been called, which is the essential oil of lavender, mixed with oil of turpentine, has been deemed one of the most efficacious poisons for these disgusting parasites. Sir Edward Willmot is said, by Dr. Heberden, to have used, with complete success, in a case of morbus pedicularis, a composition somewhat similar to the spike oil, viz. of rectified oil of turpentine and spirit of wine, each four ounces, camphor six drachms. Dr. Bateman says, a solution of the muriate of mercury in spirit, is very efficacious in the pedicular prurigo, and tends to remove the pruriginous affection of the skin, which seems to give rise to the tendency to generate lice. It is to be observed, however, that none of these pungent stimulating substances can be applied to the skin without inflicting extreme pain, unless the surface be unbroken ; for where the cuticle is abraded by scratching, or other causes, the irritation and smarting occasioned by them is intolerable, and is followed by considerable inflammation. In many cases, cleanliness itself is a sufficient remedy, and as the learned Dr. Good shrewdly observes, " a sure prophylactic."

Drawn by Jeffray *Printed by* ...

1. Meloe proscarabæus. *2. Coccus cacti*

3. Pulex penetrans. *4. Diplolepis gallæ tinctoriæ.*

London, Published by J. Wilson June 1.1831.

PULEX PENETRANS,

The Chegoe.

Pl. XXVII. *fig.* 3.

Order Syphonaptera, *Latr.* *Family* Suctoria, *De Geer.*

Gen. Char. *Body* oval, compressed, covered with a coriaceous skin, and composed of several segments; *antennæ* lamelliform, small, four-jointed; *feet* six; *rostrum* jointed, formed of two plates inclosing a sucker.

Spec. Char. *Rostrum* as long as the body.

Pulex penetrans; *Swartz, in Kongl. Vet. Ac. Nya. band.* ix. 40, t. 23, f. 10.

One of the most troublesome and noxious insects of the low regions of South America and the West India Islands is the Chegoe, a small species of flea, with a rostrum as long as the body, which often introduces itself into the skin of the inhabitants, usually under the nails of the toes, where it deposits its eggs, and produces malignant and occasionally fatal ulcers. It is a very minute insect, being one-fourth the size of the common flea, pale reddish-brown simi-transparent or shining, with the legs of a pale blueish or lead, colour. According to Ulloa, and his opinion is confirmed by Jussieu, there are two South American species of this insect. It is described as generally attacking the feet and legs; but, according to Capt. Hancock, it will penetrate any exposed part of the body. At first it occasions no farther uneasiness than a slight itching and heat; in process of time, how-

ever, a small bladder or membranous sac is formed, containing the nits or ova, which speedily multiply to such a degree as to be attended by the most fatal consequences, rendering amputation necessary, and sometimes causing death. Mr. Waterton, in his "Wanderings in South America," speaking of this insect, says, "It looks exactly like a small flea, and a stranger would take it for one. However, in about twenty-four hours he would have several broad hints that he made a mistake in his ideas of the animal. It attacks different parts of the body, but chiefly the feet, between the toe-nails and the flesh. There it buries itself, and at first causes an itching not unpleasant. In a day or two, after examining the part, you perceive a place about the size of a pea, somewhat discoloured, rather of a blue appearance. Sometimes it happens that the itching is so trivial you are not aware that the miner is at work. Time, they say, makes great discoveries. The discoloured part turns out to be the nest of the Chegoe, containing hundreds of eggs, which, if allowed to hatch there, the young ones will soon begin to form other nests, and in time form a spreading ulcer. As soon as you perceive that you have got the Chegoe in your feet, you must take a needle or a sharp-pointed knife and take it out. If the nest be formed, great care must be taken not to break it, otherwise some of the eggs remain in the flesh, and then you will soon be annoyed with more Chegoes. After removing the nest, it is well to drop spirits of turpentine into the hole, that will effectually destroy any Chegoe that may be lurking there. Sometimes I have taken four nests out of my feet in the course of a day." The female slaves in the West Indies extract these animals with uncommon dexterity. Yarico, so celebrated in prose and verse, performed this kind office for honest Ligon, who says, in his History of Barbadoes, "I have had ten (Chegoes) taken out of my feet in a morning by the most unfortunate Yarico, an Indian woman."

CANTHARIS VESICATORIA

Common Blister-Fly.

PL. XXVI. *fig.* 2.

Order COLEOPTERA, *Lin. Latr.* *Family* CANTHARIDIÆ, *Latr.*

GEN. CHAR. *Elytra* soft, elongate, linear, with the sides somewhat inflexed; *back* convex, rounded; *maxillæ* with two membranaceous laciniæ, the external one acute within, subuncinate; *antennæ* with the first joint larger than the others, the second very short, transverse, the rest obconic, the last ovoid.

SPEC. CHAR. *Body* shining golden-green; *antennæ* black; *head* broad, with a furrow on the top; *thorax* quadrate, broader before; *elytra* with an impressed line.

Meloe vesicatorius; *Lin. Syst.* i. p. 679; *Panz. Faun. Ins. Germ. fasc.* 41, f. 4. Cantharide Vesicatoire; *Oliv. Entom.* iii. n. 46, t. 1, f. *a*, *b*, *c*; *De Geer, Mem. s. l. Ins.* v. t. 1, f. 9. La Cantharide de Boutiques; *Geoffr. Hist. des Ins.* i. p. 341, t. 6, f. 5. Cantharis vesicatoria; *Latr. Gen.* ii. p. 220.

Cantharide; Mouche d'Espagne, Fr.; *Canterella dei Vesicatorj*, It.; *Cantarida*, Sp. et Port.; *Die Spanische Fliege, Blaskenzeiher*, Ger.; *Spanksflue*, Dan.; *Spanksfluga*, Swed.; *Spanskaja mucha*, Russ.; *Kantaryda*, Pol.

IN the system of Latreille the Cantharis is separated from the genus Meloe; and the insects with filiform antennæ shorter than the body, composed of eleven joints, are united into one family styled the Cantharidæ. The genus Cantharis contains about twenty well characterised species. Of these, by far the most important and valuable as an article of the materia medica is the C. *vesicatoria*, or common Blister-fly. Those in general use were

formerly brought only from Spain, whence they were called Spanish Flies. It appears in the South of Europe about the summer solstice, and single specimens have occasionally been taken in England. It feeds on several different plants, especially on the ash, elder, privet, lilac, white poplar, and tartarian honey-suckle, on which it is sometimes found in such numbers as soon to deprive whole trees of their verdure. It is distinguishable even at a distance by the disagreeable odour which it exhales, which becomes even dangerous if sustained for any considerable time. They are two-thirds of an inch in length, and one-fourth of an inch in breadth, oblong, and of a rich shining golden-green colour. The head is inflected, large, cordiform, with a furrow on the top. The antennæ are filiform, black, shorter than the body, with the first joint larger than the others. The thorax is small, glossy, nearly cordate, with a slight dorsal channel, and the anterior margin tubercled on either side. The elytra are soft, elongate, linear, the sides somewhat inflexed; the back convex, minutely rugose, marked with two elevated longitudinal lines or ridges, and covering brown membranous wings. The abdomen is terminated by two small callous sharp spines; and the legs and feet, like the rest of the body, of a brilliant gold or emerald green colour.—Fig. (*a*) represents one of the antennæ; (*b*) the maxillæ, &c. (*c*) palpi.

The female lays a mass of small eggs of a cylindrical form, flattened at the extremities, from which the larvæ make their appearance in about fifteen days. They are of a yellowish-white colour, beset with short hairs, two of which, longer than the others, are placed at the anus. The head is rounded, furnished with two little antennæ, arched and pointed. The body consists of twelve segments, of which the three anterior have each a pair of feet. The larvæ are said to live in the ground, and feed upon roots; in this situation they undergo their metamorphosis.

These insects are gathered by shaking the trees on which they are found and catching them on a cloth spread beneath. They are then killed by the steams of boiling vinegar, aud dried either in the sun or in stores. Cantharides, when properly dried and kept in close stopped glass bottles, will retain their active qualities for a great length of time; but they are liable, notwithstanding their

acrimony, to the attacks of mites, which gradually reduce them to dust. It appears, however, that these little animals feed on the inactive part only, and that the powder still possesses its vesicating powers. The largest and best are imported from Astracan and Sicily, where they are packed in chests. They should be chosen dry, entire, of a small size, free from mould and dust, of a strong nauseous odour, brilliant colour, and not mixed with the Cetonia *aurata*, and other beetles, which is frequently the case to a great extent.

Blistering-flies, when reduced to powder, have a greyish-green colour, mingled with brilliant green points. They have a very nauseous odour, and a very acrid burning taste. Their active principle is extracted both by water and by alcohol; and from the analysis of M. Robiquet it appears to reside partly in a crystalline matter and partly in a greenish volatile oil. If the inspissated decoction of these insects be treated with pure alcohol, a solution of resinous matter is obtained, which is separated by gentle evaporation to dryness, and submitted for some time to the action of sulphuric ether, forms a yellow solution. By spontaneous evaporation small crystalline micaceous plates are obtained, insoluble in water and in cold alcohol, but soluble in boiling alcohol and in ether, and very soluble in oils; on the presence of which the vesicating property of the flies depend. The smallest quantity of this matter dissolved in oil forms a liquor, which, applied to the skin quickly raises a blister. Dr. Thompson has named it *cantharadin*. Besides this peculiar substance, Cantharides contain, according to Robiquet, a green bland oil, insoluble in water, soluble in alcohol, which is the source of their disagreeable odour; a black matter, soluble in water, insoluble in alcohol, without blistering properties; a yellow viscid matter, mild, soluble in water and alcohol; the crystalline plates; a fatty bland matter; phosphates of lime and magnesia; a little acetic acid, and much lithic or uric acid.

The common Blister-Fly taken into the stomach in the dose of a few grains is an active poison both to man and animals. The symptoms produced by this insect in man are a sense of burning heat in the throat and stomach, and sometimes vomiting and diarrhœa, acute pain in the lower belly, tenesmus, great heat and

irritation of the bladder and urinary organs, distressing priapism and strangury, generally connected with suppression of urine and the discharge of blood from the urethra. If these symptoms be not relieved, they are followed by convulsions, delirium, tetanus, syncope, and death. On dissection, the brain is found gorged with blood, the stomach is inflamed, and generally the green shining particles of the powdered flies may be discernible, if it be administered in the form of powder. The omentum and peritoneum also, and the intestines, kidneys, ureters, bladder, and internal parts of generation, exhibit marks of inflammation. As no antidote has yet been discovered, the first step to be adopted is to evacuate the poison by emetics, and if vomiting has already begun it is to be encouraged by copious draughts of warm mucilaginous liquors. The warm bath will be found useful, and on the principle of removing inflammation it will be advisable to employ copious bleeding, together with leeches, and opiate frictions to the region of the stomach.

Medical Properties and Uses.—The common Blister-Flies internally are powerfully stimulant and diuretic; externally, they inflame and excoriate the skin, and are hence used as the basis of the common vesicatories. They appear to have been employed as an internal remedy so early as the time of Hippocrates, who prescribed them chiefly in cases of dropsy and amenorrhœa. Their active matter seems to have a peculiar determination to the urinary organs, as, even from external application, strangury is sometimes induced. They have, however, been occasionally employed with advantage, in very small doses continued for some time, in obstinate gleet and leucorrhœa, incontinence of urine, arising from paralysis of the sphincter vesicæ, a state which the Cantharides, by its local action, is calculated to remove. Its action requires to be moderated by the free use of diluents. It has also been employed in some chronic cutaneous affections, joined with the decoction of elm-bark or sarsaparilla, and as a stimulant in amenorrhœa. In nephritic cases attended with inflammation, in calculus of the bladder, and occasionally in pregnancy, the use of this active stimulant is not to be admitted.

It is chiefly used externally as an epispastic.

"The Cantharides in powder is mixed with lard and wax, so as to form a plaster of a proper consistence which is applied to the part, generally for 10 or 12 hours; at the end of that time the cuticle is raised, forming a vesicle; this is then cut, to allow the serous fluid to be discharged, and the inflamed part is dressed with any mild ointment. The principal circumstance which requires caution in the application of the cantharides plaister, is that determination of action to the neck of the bladder which gives rise to strangury. This is more peculiarly liable to occur where the system is uncommonly irritable, where the blister is large, or where it is applied to a newly abraded surface, as to the head recently shaved; and as it is a very painful affection, not easily removed, care ought to be taken to guard against it. Camphor has been sometimes added to the blistering plaster, with the view of obviating this. But it is doubtful if it has any such effect: the plentiful use of diluents, while the blister is applied, prevents it much more certainly; and it is always proper when a blister is applied, especially if large, or in inflammatory diseases, to order the patient to drink freely of any mild diluent liquor. Where the strangury does occur from the application of a blister, it is best relieved by an enema of tepid water, with a little expressed oil, and 30 or 40 drops of tincture of opium, and by the use of the warm bath, or warm fomentations.

"In some diseases, as in apoplexy, it is of importance to be certain of the operation of an epispastic, and to have its effect produced in a short time. To attain these, a compound plaster is ordered by the Edinburgh College—Emplast. Meloes Vesicat. Comp.—in which the stimulating power of the cantharides is increased by the addition of other acrid substances, Burgundy pitch, turpentine, verdigris, mustard, and pepper. In the application of this still more caution is necessary to guard against the occurrence of strangury.

"After a blister has been raised, it is often of advantage to convert the serous discharge into one of a purulent nature, by exciting suppuration, or to form what is termed an issue: this can easily be effected by the application of any acrid stimulating ointment: one composed of wax and oil, with a small proportion of cantha-

rides, is commonly used for this purpose, as, by the irritation it excites, it keeps up the inflammation, and at length produces suppuration. Any foreign body retained on the inflamed part answers the same purpose. What are named Orange Peas, the small unripe fruit of the orange, polished, are usually employed, as by their odour they cover the fœtor of the discharge. One of these is retained on the blistered part by a slip of adhesive plaster, and by the irritation it occasions, keeps up a constant discharge. A seton, or cord introduced by a needle answers the same purpose. When a puriform discharge is thus established in a part, considerable effects arise from the morbid action which it continues, and the evacuation it occasions. It is a practice often employed with advantage in asthma, paralysis, and a number of chronic affections."

Dose.—The dose of the powder may be from one to three grains, and of the tincture from ten drops to one drachm.

Off. Prep.—Tinctura Cantharidis, L. E. D. Emplastrum Cantharidis Vesicat. L. E. D. Empl. Cantharidis Vesicat. Comp. E. Ceratum Cantharidis, L. Ung. Cantharidis, L. Ung. infusi Canth. Vesicat. E. Ung. Cantharidis, D.

CANTHARIS CINEREA.—*Cinereous Blister-Fly.*

Spec. Char. Black; margin of the *thorax* and *elytra* cinereous.

Lytta marginata; *Fabr. Syst. Ent.* p. 260. Meloe cinereus; *Forst. Nov. Sp. Ins.* p. 62. Cantharis marginatus; *Oliv. Ent.* iii. no. 46.

Inhabits South America; Fabricius speaks of it as a native of the Cape of Good Hope. It is also said to be found, though far less plentifully, in some parts of the east of Europe.

CANTHARIS VITTATA.—*Riband Blister-Fly.*

Spec. Char. Brown; *thorax* with three yellow lines; *elytra* black, with the margin of the suture and a longitudinal line yellow; *legs* black.

Lytta vittata; *Fabr. Syst. Ent.* p. 260, n. 3; *Pallas, Ins. Sib.* t. *E.* f. 33; *Oliv. Ent.* iii. n. 46, f. 3.

Common in many parts of America, where, like the foregoing species, it is used for exciting vesications, in place of the Cantharis *vesicatoria*. These insects are said to blister more speedily and with less pain, at the same time that they cause no strangury.*

MYLABRIS CICHOREI,

Banded Mylabris.

Pl. XXVI. *fig.* 5.

Gen. Char. *Antennæ* composed of eleven joints, inserted before the eyes on the rostrum, thickening towards their points; third joint elongate, cylindrical; fourth, fifth, and sixth, subcylindrical; the others broader and gradually thicker, obconic; the last larger, ovate acute; *rostrum* elongate, narrow; *eyes* globose, prominent; *thorax* small; *body* oblong; *elytra* elongate, soft; *palpi* villose, sub-filiform, with the last joint compressed.

Spec. Char. Black; *elytra* yellow, with three transverse toothed black bands.

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* Illiger, *Mag.* i. p. 256.

Meloe Cichorei; *Syst. Nat. Gmel.* i p. 2018. Mylabris Cichorei; *Fabr. Ent. Syst.* i. p. 88; *Oliv. Ent.* iii. no. 47, t. 1, f. 1, et t. 2, f. 13.

This insect is very common in the East Indies, and is found on the flowers of the Cichoreum or succory. It is somewhat larger than our common Blister-fly; but it varies very much in size and in the colour of the elytra, which are elongate, smooth, yellow, and marked with three undulating transverse black bands. It has long been employed in China as an epispastic, and seems to have been considered the most powerful vesicatory among the ancients. "The most efficacious sort of Cantharides," says Dioscorides, "are of many colours, having yellow transverse bands; the body oblong, large, and fat; those only of one colour are without strength."* Though the generic term Cantharis seems to have applied indiscriminately to several kinds of insects, the ancients were certainly well acquainted with our common sort, and made use of it, as well as Cetonia *aurata*, and some other species mentioned by Pliny.†

Another species of Mylabris has been described by Major-Gen. Hardwicke in the Asiatic Researches,‡ plentiful in all parts of Bengal, Bahar, and Oude, which is fully as efficacious as the common Spanish fly.

MELOE PROSCARABÆUS,

Common Oil-Beetle.

Pl. XXVII. *fig.* 7.

Gen. Char. *Antennæ* moniliform, tapering towards their points; *palpi* four, unequal, subclavate; *elytra* rounded at the apex, covering only a part of the abdomen, short, oval, diverging at the suture; *wings*

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* *Mat. Med.* lib. ii. cap. 65.

† *Hist. Nat.* lib. xix. c. 4.

‡ Vol v. p. 213.

none; *legs* compressed; *posterior tarsi* 4-jointed; *anterior* and *middle tarsi* with three joints; *abdomen* very large and soft.

SPEC. CHAR. Black; *head* and *thorax* punctated; *elytra* rugose; *antennæ*, sides of the *head*; *thorax*, and *feet* violaceous.

Meloe proscarabæus; *Syst. Nat. Gmel.* i. 2017; *Fabr. Syst. Ent.* 259; *Oliv. Ent.* iii. 45, 5, t. 1, f. 1; *Marsh, Ent. Brit.* i. 481, 1; *Leach, Trans. Lin. Soc.* xi. p. 46, t. 7.

Le Proscarabee; Canterelle; Scarabee onctueux des marechaux, Fr.; *Der Zwitterkäfer; Maywurm*, Ger.; *Oliebillen*, Dan.; *Majbagge*, Swed.; *Maslianka*, Russ.

THE Oil-beetle is found very frequently in spring, in our meadows and pastures, creeping slowly; and feeding on the leaves of the violet, anemone, hound's-tongue, and on the different species of *Ranunculus*. I have frequently taken it on Hampstead Heath, and in sand-pits near the seven-mile stone, on the lower road to Woolwich. The body is entirely of a black colour, the antennæ, sides of the head, and feet, are tinged with violet. The head is inflected and gibbous, the antennæ moniliform, the thorax somewhat cordate; and the elytra soft, rugose, and much shorter than the abdomen. The female, when distended with eggs, is more than double the size of the male.—Fig. (*a*) represents the antennæ of the male; (*b*) antennæ of the female.

This insect, when touched, exudes an acrid fluid, of an oily consistence, and of an orange colour, from each joint of its legs, which is a powerful rubefacient, and was formerly celebrated for its supposed efficacy in chronic rheumatism, applied to the parts in the form of an embrocation. It has been likewise recommended as a diuretic in dropsies, and on the continent, particularly in Germany, as a remedy in hydrophobia. The late King of Prussia (Frederick the Great) purchased the nostrum from the discoverer for a valuable consideration, as a specific against this terrible malady; and in 1781, it was inserted in sect. ii. of the *Disp. Boruss. Brand.* According to this publication, twenty-five of these animals that

have been preserved in honey, are, with two drachms of powdered black ebony, one drachm of Virginia snake root, one drachm of lead filings, and twenty grains of fungus sorbi, to be reduced to a very fine powder; the whole, with two drachms of theriacæ of Venice, (and if necessary with a little elder root) are to be formed into an electuary. Professor Christison in his excellent work on Poisons, quotes an account from Rust's Magazine, of four persons who took the powder of this insect from a quack for spasms of the stomach. The principal symptoms were stifling and vomiting; and two of the people died within twenty-four hours.* The Meloe *variabilis,* which has been confounded by all the continental writers who have noticed it with the M. *maialis* of Linn. is said to possess the same acrid properties. It is figured by Dr. Leach in the 11th vol. of the Transactions of the Linnean Society, t. vi. f. 1, 2, and by Donovan under the name of Meloe *variegatus.*

COCCUS CACTI,

Cochineal Insect.

Pl. XXVII. *fig.* 2.

Order Hemiptera, *Lin. Cuv.* Omoptera. *Family* Coccidæ, *Leach.* Gallinsecta, *Latr.*

Gen. Char. *Antennæ* 11-jointed, filiform or setaceous; *tarsi* with one joint and one nail; *male* destitute of a rostrum, with two wings covering the body horizontally; *abdomen* terminated by two setæ; *female* apterous, furnished with a rostrum.

Spec. Char. *Male* very small, with the *antennæ* shorter than the body; *body* elongated, deep red, terminated

* *Magazin für die gesammte Heilkunde,* viii .109.

by two long diverging setæ; *wings* large, white, crossed over the abdomen; *female* nearly twice as large as the male, deep brown, covered with a white farina; *antennæ* short; *body* flatted below, convex; *feet* short.

Coccus Cacti; *Lin. De Geer, Fabr.; Thiery de Menonv. Traite de la Cult. du Nopal. Latr. Hist. Nat. des Fourm., et Rec. de Mem.* p. 326.

La Cochenelle du nopal, Fr.; *Die Koschenille,* Ger.; *Koskenillen,* Dan. et Swed.

Cochineal, so highly prized for its valuable properties in producing the dye which bears its name, is a native of South America. It comes to us in the form of a reddish grain, covered with a white powder or bloom, and feeds on various species of Cactus or Indian fig. In Mexico, where the insect is domesticated and reared with the greatest care, the plant is called Nopal, and has been generally supposed to be the *Cactus cochinilifer,* but according to Humboldt, is unquestionably a distinct species, to which he has given the name of C. *Bonplandii.* The female, which alone is valuable for its dye, is about one-eighth of an inch in length; the body is depressed, downy, transversely rugose, of a purplish red colour, flat below and convex above; the head is furnished with a rostrum rising from the breast, with a vagina and setæ; the legs are six in number, short and black. The male is a very small fly, with long filiform autennæ, and two erect wings; the body is of a deep red colour, with two very long setæ proceeding from the apex of the abdomen. No good figure and description of this interesting species has yet been published.

Cochineal is chiefly cultivated in the intendency of Oaxaca; and some plantations contain 50 or 60,000 nopals in lines, each being kept about four feet high for more easy access in collecting the dye. The cultivators prefer the most prickly varieties of the plant, as affording protection to the cochineal from insects; to prevent which from depositing their eggs in the flower or fruit, both are carefully cut off. The greatest quantity, however, of cochineal employed in commerce, is produced in small nopaleries belonging to Indians of extreme poverty, called *Nopaleros.* They

plant their nopaleries in cleared ground on the slopes of mountains or ravines, two or three leagues distance from the villages; and when properly cleaned, the plants are in a condition to maintain the cochineal in the third year. As a stock, the proprietor in April or May purchases branches or joints of the *Tuna de Castilla*, laden with small cochineal insects recently hatched (*Semilla*). These branches, which may be bought in the market of Oaxaca for about three francs (2*s.* 6*d.*) the hundred, are kept for twenty days in the interior of their huts, and then exposed to the open air under a shed, where from their succulency they continue to live for several months. In August and September the mother cochineal insects, now big with young, are placed in nests made of a species of *Tillandsia* called *Paxtle*, which are distributed upon the nopals. In about four months the first gathering, yielding twelve for one, may be made, which in the course of the year is succeeded by two more profitable harvests. This period of sowing and harvest refers chiefly to the districts of Sola and Zimatlin. In colder climates the semilla is not placed upon the nopals until October or even December, when it is necessary to shelter the young insects by covering the nopals with rush mats, and the harvests are proportionably later and unproductive. In the immediate vicinity of the town of Oaxaca the Nopaleros feed their cochineal insects in the plains from October to April, and at the beginning of the remaining months, during which it rains in the plains, transport them to their plantations of nopals in the neighbouring mountains, where the weather is more favourable.

Much care is necessary in the tedious operation of gathering the cochineal from the nopals, which is performed with a squirrel or stag's tail by the Indian women, who for this purpose squat down for hours together beside one plant; and notwithstanding the high price of the cochineal, it is to be doubted if the cultivation would be profitable were the value of the labour more considerable.

The cochineal insects are killed either by throwing them into boiling water, by exposing them in heaps to the sun, or by placing them in ovens (*Temazcalli*) used for vapour baths. The last of these methods, which is least in use, preserves the whitish powder on the body of the cochineal, which being less subject to the

adulterations so often practised by the Indians, bears a higher price both in America and Europe.*

The quantity at present annually exported from South America is said by Humboldt to be 32,000 arrobas, estimated at 2,400,000 piasters, about 500,000*l.* sterling.

Cochineal has a faint disagreeable and a bitter austere taste. According to M. M. Pelletier and Caventou, the colouring matter which composes the principal part of the cochineal is mixed with a peculiar animal matter, a fatty matter, phosphate and carbonate of lime, and muriate and phosphate of potass. The colouring matter which they have named *carminium* is soluble in water, alcohol, and solutions of pure alkalies. Carmine is prepared by precipitating the colouring matter from its solution in water, by means of alum or oxide of tin.

Medical Properties and Uses.—Cochineal has been recommended as an antispasmodic and anodyne in hooping cough; but its principal use is to impart a fine colour to tinctures and other preparations. It is sometimes adulterated with an admixture of a manufactured imitation, composed of coloured dough. The fraud may be very easily detected by the action of boiling water, which dissolves the spurious grains, while it has little action upon the genuine insect.

Lac is the produce of an insect formerly supposed to be a kind of ant or bee, but now ascertained to be a species of Coccus; and is collected from various trees in the East Indies, where it is found so abundantly, that, were the consumption ten times greater than it is, it could be readily supplied. This substance is made use of in that country in the manufacture of beads, rings, and other female ornaments. Mixed with sand it forms grindstones; and added to lamp or ivory-black, being first dissolved in water with the addition of a little borax, it composes an ink not easily acted upon when dry by damp or water. In this country, where it is distinguished by the names *stick-lac* when in its native state, unseparated from the twigs to which it adheres; *seed-lac* when separated, pounded, and the greater part of the colouring matter

* Humboldt's *Political Essay on New Spain*, iii. p. 72-9.

extracted by water; *lump-lac* when melted and made into cakes; and *shell-lac* when strained and formed into transparent laminæ. It has hitherto been chiefly employed in the composition of varnishes, japanned ware, and sealing wax: but within these few years it has been applied to a still more important purpose, originally suggested by Dr. Roxburgh—that of a substitute for cochineal in dyeing scarlet.

DIPLOLEPIS GALLÆ TINCTORIÆ,

Gall-nut Insect.

PL. XXVII. *fig.* 4.

Order HYMENOPTERA. *Family* DIPLOLEPIDÆ, *Latr.*

GEN. CHAR. *Antennæ* filiform, thicker towards their extremities, of 15 joints in the male; *antennæ* in the female with 14 joints; *palpi* very short, of 4 joints, the last obconic; *abdomen* with the inferior part compressed, triangular-ovoid; *inferior wings* without distinct nervures; *upper wings* with the marginal cells linear-lanceolate.

SPEC. CHAR. *Body* pale, testaceous, clothed with a very short silky pubescence; *abdomen* shining and blackish at the base; *upper wings* much larger than the inferior; *legs* rather short.

Diplolepis gallæ tinctoriæ; *Oliv. Ency. Meth.; Latr. Hist. Nat. des Crust. et Ins.* xiii. 206; *Steph. and Church. Med. Bot.* iv. t. 152.

INHABITS Asia, on the Quercus *infectoria*, and produces the nut-galls of commerce. See "*Medical Botany*," vol. iv. art. 152.

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Drawn by Joffroy

1. Vespa Crabro. *2. Bombus terrestris.*

3. Apis mellifica

London Published by J. Wilson, June 1 1831.

VESPA CRABRO.

The Hornet.

PL. XXVIII. *fig.* 1.

Order HYMENOPTERA. *Family* VESPADÆ, *Leach.*

GEN. CHAR. *Mandibles* with the second tooth much broader than the two under ones, the upper one obtuse; *clypeus* with the anterior margin broadly truncate and somewhat emarginate, with a tooth on each side; *abdomen* ovoid-conic, with the base abruptly truncated, and very shortly pedunculated.

SPEC. CHAR. *Antennæ* obscure, with the base ferruginous; *head* ferruginous, pubescent, with the upper lip yellow; *mandibles* black at the extremity; *thorax* black, pubescent, with the anterior portion brownish; first segment of the *abdomen* black, with the base ferruginous, and the margins yellowish, the other segments black at the base, yellow at the extremity, with a small black lateral point on each; *feet* brownish.

Vespa crabro; *Lin. Geoff. Fabr. Latr.* La Guepe Frelon, *Cuv.* *Le Frelon*, Fr.; *Calabrone*, It.; *Abispon*, Sp.; *Vespao*, Port.; *Die Hornis*, Ger.; *Gedehams*, Dan.; *Bolgeting*, Swed.; *Truten*, Russ.

THE Hornet is a much more formidable insect than the common Wasp, and of considerably larger size. It is common throughout Europe, building its nest in hollow trees. The females, having passed the winter in torpidity, early in spring issue from their hiding-place, and search out a convenient place for the esta-

blishment of a colony, and begin the operation by building a thick and solid pillar of the same materials as the other parts of the nest, but much harder and more compact. The matter of which this is formed consists principally of the bark of the ash detached in filaments, and ground by their mandibles into a paste which hardens as the work goes on. The column or pillar the female fixes in the most elevated part of the vault, and attached to it is a kind of cap or roof which protects their combs from above. These cells are hexagonal, with their openings turned downwards, for the purpose of containing her eggs, and the grubs which issue from them. As in spring only female wasps are seen, it is conjectured that they have been fecundated before winter, for they commence depositing their ova as soon as the cells are ready. These ova are soon hatched, and when the larvæ have acquired sufficient size, they line their cell with a silky substance, and in this substance undergo their metamorphosis into *pupæ,* and afterwards into perfect or winged insects. The insects first produced are the neuters, working insects, or labourers. These occupy themselves in the construction of the dwelling and feeding of the larvæ. The female continues to deposit her ova; the family is consequently augmented; and the nest becoming at length too small, necessity requires it to be enlarged. When this is completed a new addition of pillars is formed connected with the first, till the whole cavity is filled except an entrance about an inch in diameter. In the month of September and beginning of October, the young males and females emerge from their pupæ state, and all the larvæ which have not completed their transformation perish from cold or want of food, for the Hornets cease to feed them after this period, and even throw them out of the nest. The males and neuters perish daily, so that towards the end of winter the females, which are enabled to pass that season in a torpid state are the only ones that remain alive to propagate the race by the formation of new colonies.

The inflammation and swelling arising from the sting of the Hornet is much more violent than that produced by the sting of bees, and is often productive of very serious and even fatal consequences.* The wounds occasioned by these insects are attended

* Amoreux, *Anim. Venim.* 242.

with a very acute pain in the part, very quickly succeeded by an inflammatory swelling, and more or less fever according to the severity of the injury. In general it is sufficient to rub the part with olive-oil, vinegar, or some spirituous embrocation, after extracting the sting. In more severe cases emollient anodyne applications should be resorted to, in order to allay the irritation and swelling, and five or six drops of the volatile alkali administered every fifteen minutes. The same mode of treatment is to be adopted to relieve the pain and inflammation arising from the sting of the common wasp, humble-bee, hive-bee, ichneumon fly, &c.

BOMBUS TERRESTRIS,

Common Humble-Bee.

PL. XXVIII. *fig.* 2.

Order HYMENOPTERA. *Family* APIARIÆ, *Latr.*

GEN. CHAR. *Antennæ* filiform, broken; *labium* transverse; *mandibles* spoon-shaped, rounded at the apex, toothed; *palpi* four, the maxillary palpi spatulate; *ocelli* disposed in a transverse line; *body* very hairy; *hairs* disposed in particoloured fasciæ or spots; posterior *tibiæ* terminated by two spines.

SPEC. CHAR. Black, hairy; base of the *thorax* and *abdomen* marked by a yellow bar; *anus* white.

Apis terrestris; *Syst. Nat. Gmel.* p. 2781. Bombus terrestris; *Kirby, Mon. Apum. Angl.* ii. p. 350, sp. 97.

L'Abeille terrestre, Fr.; *Die Erdhummel*, Ger.

THE number of British species composing the present genus, of which Bombus *terrestris* is the type, amount to about thirty-nine. They live in societies of from fifty to sixty or more individuals, in an oval or roundish nest, in holes in the earth or beneath stones

on the surface. When they do not meet with an accidental cavity ready made they excavate one with great labour. It is of considerable extent, broader than it is deep, and constructed in the form of a dome, by a convex vault or coping of moss, the interior surface of which is lined with a kind of coarse wax, to keep out the wet. In this nest, which measures from four to six feet in diameter, the female deposits little masses of brown wax, forming a kind of irregular cells. In these cells, which are of three different sizes according to the sex of the destined inhabitant, the eggs are laid, and the larvæ, having lived their appointed period in that state, form each its coccoon, which is pierced at the bottom, and through this opening the perfect insect finds its exit. In every nest are placed a few cylindrical cells of coarse wax, filled with pure honey, on which feed the complete insects.

The Humble-Bees consist of males, females, and two distinct varieties of neuters or labourers. The females, of which there are more than one in each society, are the largest, the males are of middle size, as well as one variety of neuters, the smaller kind of which are scarcely larger, indeed sometimes even less, than the hive-bee. According to the observations of the younger Huber, many of the labourers, which are produced in the spring, unite with the males of the same race, and soon after lay their eggs, which produce only individuals of the latter sex, and are destined in the spring of the following year to lay the foundation of a new colony.

The *Poison* of Bees and Wasps is a transparent fluid, contained in a small vesicle, forced through the hollow tube of the sting into the wound inflicted by that instrument. It is at first sweet to the taste, but immediately afterwards hot and acrid, like the milky juice of the Spurge. From the experiments of Fontana, we learn that it bears a striking resemblance to the poison of the Viper, which, however differs from it in being tasteless, and not affecting vegetable blues.* That of the Humble-Bees is much less active than that of the Hive-Bee and the Wasps.

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* *On Poisons*, i. p. 265.

APIS MELLIFICA.

Common Honey or Hive-Bee.

PL. XXVIII. *fig.* 3.

Order HYMENOPTERA. *Family* APIARIÆ. *Latr.*

GEN. CHAR. *Posterior tibiæ* without spurs or heels; *posterior tarsi* with the first joint long and much compressed; *upper wings* with three submarginal cells complete, the last oblique and linear.

SPEC. CHAR. Blackish; *abdomen* of the same colour, with a transverse greyish band, formed by the down at the base of the third and following segments.

Apis mellifica; *Lin. Syst. Gmel.* p. 2774; *Kirby, Monogr. Apium Angl.* ii. p. 312, sp. 73.

Abeille à miel, Fr.; *Ape, Pecchia*, It.; *La Abeja comun ó trabajadora*, Sp.; *Abelha*, Port.; *Die Honigbiene*, Ger.; *Pschela*, Russ.

THE Honey-Bee is frequent in the wild state in the forests of Russia, and in different parts of Asia, occupying cavities in trees and rocks, but is very rarely to be found in Britain. Hence the insect may have either been domesticated at a very remote period by the inhabitants, or it may have been introduced from abroad. To America, where it is very common in the woods, it is supposed to have been carried in the sixteenth or seventeenth century. "It is," says Mr. Starke, "of an oblong form and pubescent, with a triangular head nearly the breadth of the thorax, bearing two filiform geniculate and short antennæ of from ten to twelve joints. The eyes are large oval and entire, and there are three ocelli disposed in a triangular form on the vertex. The mouth is composed of a transverse labrum, two strong mandibles, two jaws, a long and slender lip, and four palpi, of which the maxillary ones are very small and the labial ones long. The lip is terminated by a long tongue or probosis, striated transversely, hairy, with the

extremity truncated and slightly dilated. This tongue is inclosed in a scaly semicircular sheath. The thorax is short, rounded, very obtuse behind; and the abdomen conical or truncated before, and rounded or convex above, is suspended at its posterior extremity by a small filament or peduncle. The abdomen is composed of from six to seven segments. The legs are less hairy than in the other congenerous insects, and the first joint of the tarsi is large, flattened, in the form of a square palette, a little longer than broad. All the individuals have wings; the upper wings have a narrow and elongated radial cell and three cubital cells, of which the first is square, receiving the recurrent nerve, and the third oblique linear, receiving the second recurrent nerve.

"The societies of Bees include three kinds of individuals:—the workers or neuters, forming the greater portion of the population; the males or drones in limited number; the females, of which there is generally but one in each hive, known by the name of the *Queen-bee*. The workers and the females are armed with a sting; and M. Huber, jun. has remarked a difference among the workers, the largest being destined for out-door employment, and the smaller busying themselves in cleaning the cells and feeding the larvæ within. Of the number of Bees in a hive, from 15,000 to 30,000, the males or drones form a portion to the extent of 200 to 1000 or upwards, the queen or female bee one, and the others are neuters or workers. The males and females only are evolved for the reproduction of the species. The female deposits a great number of ova every day in spring, the cells for which are prepared by the workers; and the deposition of ova ceases in autumn, because the pollen of flowers for the support of the larvæ fails. The individuals first produced are all workers; about the end of two days the ova for the males are laid, and afterwards those for the females, which are all deposited in corresponding cells. The ova are of an elongated form, slightly bent, of a blueish-white colour, about a line long, and they are hatched in the course of three, four, five, or six days, according to the temperature. The larvæ produced from these ova are in the form of a small wrinkled white worm, without feet; and they are fed by the workers, who visit each cell for this purpose with their appropriate food.

The cells not occupied by the larvæ are filled with honey. The combs are placed parallel to one-another, and the cells of which they are composed are of a hexagonal form constructed with much art and regularity.

"When deprived of a queen, another is soon produced by the workers rearing one of their own larvæ for this purpose, which, by a particular treatment, becomes a female. This fact has led to the opinion that the neuters or workers are but imperfectly developed females. At a certain period of the year, the males, having fulfilled the purpose of their being, are put to death, along with all their pupæ and larvæ."* The queen differs considerably in size and appearance from the males and workers. She is about eight lines and a half in length, while the males are seven, and the workers six; her abdomen is proportionally longer, her wings so short as scarcely to reach past the third segment, and her colour deep brown tinged with yellow.

The general appearance and qualities of honey are familiar to every one. That which runs from the comb without expression, contains a less proportion of wax, and is considered the best. It is at first thin and limpid, but when kept, partly crystallizes into little irregular concretions. It is of a whitish or yellowish colour; it has a peculiar fragrant odour, and a sweet acidulous taste. A less pure honey is obtained by cutting the combs in pieces, and exposing them before the fire to render the honey more liquid; and a still inferior kind is obtained by heating the remainder still more in a vessel over the fire, and then squeezed through a canvass bag. The honey which is obtained from young hives that have never swarmed is denominated virgin honey. To purify the wax nothing more is necessary than boiling the empty combs, and those deprived of the honey, in water, and removing the scum which will rise in the successive meltings. Honey is frequently adulterated with flour; the fraud, as Dr. Thompson observes, is easily detected by mixing it with tepid water, which dissolves the honey, while the flour remains nearly unaltered.

Honey is evidently a variety of sugar, containing a crystallizable

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* *Elements of Natural History*, vol. ii. p.

and an uncrystallizable portion, mucilage, wax, an acid, and sometimes a little essential oil. It is soluble in water, and partially in alcohol; and, like sugar, when diluted with water, and subjected to a proper temperature, passes into the acetous and vinous fermentation, affording what is called *mead* and *metheglin.* Nitric acid unites with honey, and converts it into oxalic acid.

The tongue is the principal organ in collecting the honey; when employed, it is extended, and the insect apparently licks the honey and passes it down on its upper surface, which is at its base, concealed by the mandibles. It is conveyed by this orifice through the œsophagus into the first stomach, usually called the honey-bag, which is swelled when full of it to a considerable size. All the honey we observe in the combs is a vegetable product, being principally collected by the bees from the nectaries of flowers, in which it is abundantly secreted. After being swallowed by the bees, it is disgorged into their cells; but it probably undergoes some change in that organ before it is excreted, and deposited in the comb. How the wax is secreted, or what vessels are appropriated to that purpose, is not ascertained. There is reason to believe that it transudes through two taper-form whitish pockets of a membranaceous texture occupying the base of the rings connecting the body in the form of wax.

The color and flavor of honey, and its effects on the human constitution varies according to the nature of the flowers from which it is collected. That of Narbonne, in France, where rosemary abounds, is said to have a very manifest flavour of that plant, and to be imitable by adding to other honey an infusion of rosemary flowers. Many of the ancient writers, particularly Xenophon, have mentioned instances of deleterious effects being produced by honey, supposed to have been collected by bees from poisonous plants. The Greek soldiers, in their celebrated retreat after the death of the younger Cyrus, found a kind of honey near Trebisond, on the shores of the Euxine or Black Sea, which rendered those who ate of it like mad-men or persons inebriated; and numbers lay upon the ground as if there had been a defeat. The same fact is recorded by Diodorus Siculus. Pliny, who mentions this honey, calls it *Mænomenon,* and observes that it is said to be collected from

a species of Rhododendron.* Dr. Barton, an American physician, observed a poisonous kind of honey in the western parts of Pensylvania, near the river Ohio. The usual symptoms produced by honey of this description are dimness of sight, vertigo, ebriety, pain in the stomach and intestines, low pulse, profuse perspiration, foaming at the mouth, vomiting, diarrhœa, cold extremities, convulsions, and in a few instances death. In these cases gentle emetics, and purgatives of castor oil, together with the use of warm fomentations were found to be the most efficacious remedies. The plants from the flowers of which the bees are capable of extracting a poisonous honey, are principally the Kalmia *angustifolia* and *latifolia*, of Lin.; the Kalmia *hirsuta*, of Walter; the Andromeda *mariana*; the Rhododendron *maximum*† or large Rose-bay; the Azalea *nudiflora*; and the Datura *Stramoninum*.‡

The domesticated or Hive-bee, is the same, according to Latreille, in every part of Europe, except in some districts in Italy, and probably also in the Morea, and the Isles of the Archipelago, where a different species (Apis *ligustica*, of Spinola) is commonly cultivated.§ Honey is obtained, however, in Asia and America, from many other species both wild and domestic.|| In South America, quantities are collected from the nests built in trees, by Trigona *Amalthea*, and other species of this genus recently separated from Apis. The Apis *fasciata*, of Latreille, which is extensively cultivated in Egypt, is supposed to have been attended to for ages before our Hive-Bee. In Madagascar the inhabitants have domesticated Apis *unicolor*; Apis *Indica* is cultivated in India, at Pondicherry, and in Bengal; A. *Adansonii*, at Senegal; and according to Fabricius, the A. *acraensis*, *laboriosa*, and others in the East and West Indies,

* Xenoph. *Anabas*. l. iv. Plin. *Hist. Nat.* l. xxi. c. 13.

† Geo. H. Welchius, a learned German writer, quoted by Baron Haller, (*Hist. Stirp. Indig. Helv.* i. p. 433,) says that the flesh of a hare which was fed with the leaves of the Rhododendron *ferrugineum* proved fatal to the guests.

‡ See *Transactions of the American Philosophical Society*, vol. v. p. 51.

§ See an interesting account of a Mexican wild bee, (Melapona *Beecheii*,) with a description of the insect and its hive, in Capt. Beechy's *Voyage to the Pacific*, part 2, p. 613, by E. T. Bennet, Esq. F. L. S.

|| Latreille, in Humboldt and Bonpland, *Recueil d'Observ. de Zoologie*, &c. p. 300.

might be domesticated with greater advantage than even the Apis *mellifica*.

Medical Properties and Uses.—Honey is demulcent, and externally detergent and stimulant. It agrees in its alimentary properties with sugar, and in some countries forms a nutritive article of diet. According to Azara, one of the chief articles of food of the Indians who live in the woods of Paraguay, is wild honey.* With some constitutions honey proves a pretty active aperient, and sometimes produces colic, and other disagreeable symptoms, in which case, as Dr. Thompson justly observes, simple syrup should be preferred in all cases for forming medicinal preparations for internal use. Combined with vinegar, either alone or with the impregnation of the active matter of vegetables, it forms the kind of composition named Oxymel. In pharmacy, it is occasionally employed as a means of blending with and suspending insoluble substances in water. As a local stimulant and detergent it forms a useful adjunct to gargles, in cynanche, and apthous ulcerations of the mouth and fauces. Combined with verdigris it is applied as a stimulant and escharotic to foul ulcers. The empirical nostrum sold under the name of balsam of honey, is merely pound tincture of benzoin of the pharmacopœias.

Wax has been given internally in diarrhæa and dysentery, in the form of emulsion, combined by means of soap, with mucilaginous mixtures; but it is chiefly employed in the composition of ointments and cerates.

Off. Prep.—Mel. Despumatum, L. D. Mel. Boracis, L. Mel. Rosæ, L. D. Oxymel simplex, L. D. Oxy. Colchici, D. Oxy. Scillæ, L. D.

APIS LIGUSTICA, *Spinol.*—Nearly similar to the preceding; the first two segments of the abdomen, except the posterior margin, and the base of the third, pale reddish.—Inhabits Italy.—*Nouv. Dict. Hist. Nat.* i. 47.

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* *Voy. dans l'Amer. Merid.* i. 162.

APIS UNICOLOR, *Latr.*—Almost black, shining, the abdomen without spots or coloured bands.—Inhabits the Isle of France.—*Nouv. Dict.* i. 47.

APIS INDICA, *Fabr.*—Black, with a grey cinereous down, the first two segments of the abdomen and the base of the third reddish-brown.—Inhabits Bengal, &c. —*Nouv. Dict.* i. 47.

Class XII.—ENTOZOA.

Body soft, elongated, naked, smooth, without head, properly so called, eyes, or feet; mouth formed of one or many suckers, and furnished in the greater number with minute teeth, by which they attach themselves to and pierce through the bodies of animals; no tentacula or distinct organs of respiration; intestinal canal without cœca or convolutions, and in some scarcely perceptible; sexes distinct.

The animals of this class are parasitic, or live and propagate only in the bodies of other animals. It seems to be a law of nature that all animals have other animals still smaller which reside within them, and derive their nourishment from their various textures. Of these, some are common to several classes of animals, while others, again, are peculiar to, and are only found in particular species. They occur not only in the alimentary canal and in the vessels which communicate with it, but in the cellular tissue, in the liver and gall-bladder, in the cornea of the eye, the bronchiæ, the fauces, the kidneys, in the parenchyma of all the internal organs, and even in the brain itself. Goeze says, that worms have been found in the intestines of the human embryo. Some of these are evidently taken in with the food and drink, and are called

ectozoa; while others originate from ova in the various textures and cavities of the body, and are denominated *entozoa.* The origin of intestinal worms and all other entozoa, has long been involved in great obscurity; it is, however, now ascertained not only that the greater part produce ova or living young, but many have separate sexes, and couple as ordinary animals.*

DIV. I.—*Worms which inhabit the intestinal canal.*

TRICHOCEPHALUS DISPAR,

The Long Thread-Worm.

PL. XXIX. *fig.* 1, 2.

Order NEMATOIDEA, *Rudolphi.*

GEN. CHAR. *Body* round, elastic, the posterior part thick and clavated; the *anterior capillary* sometimes with a knob at the end; *mouth* orbicular; *penis* of the male simple, inclosed in a sheath.

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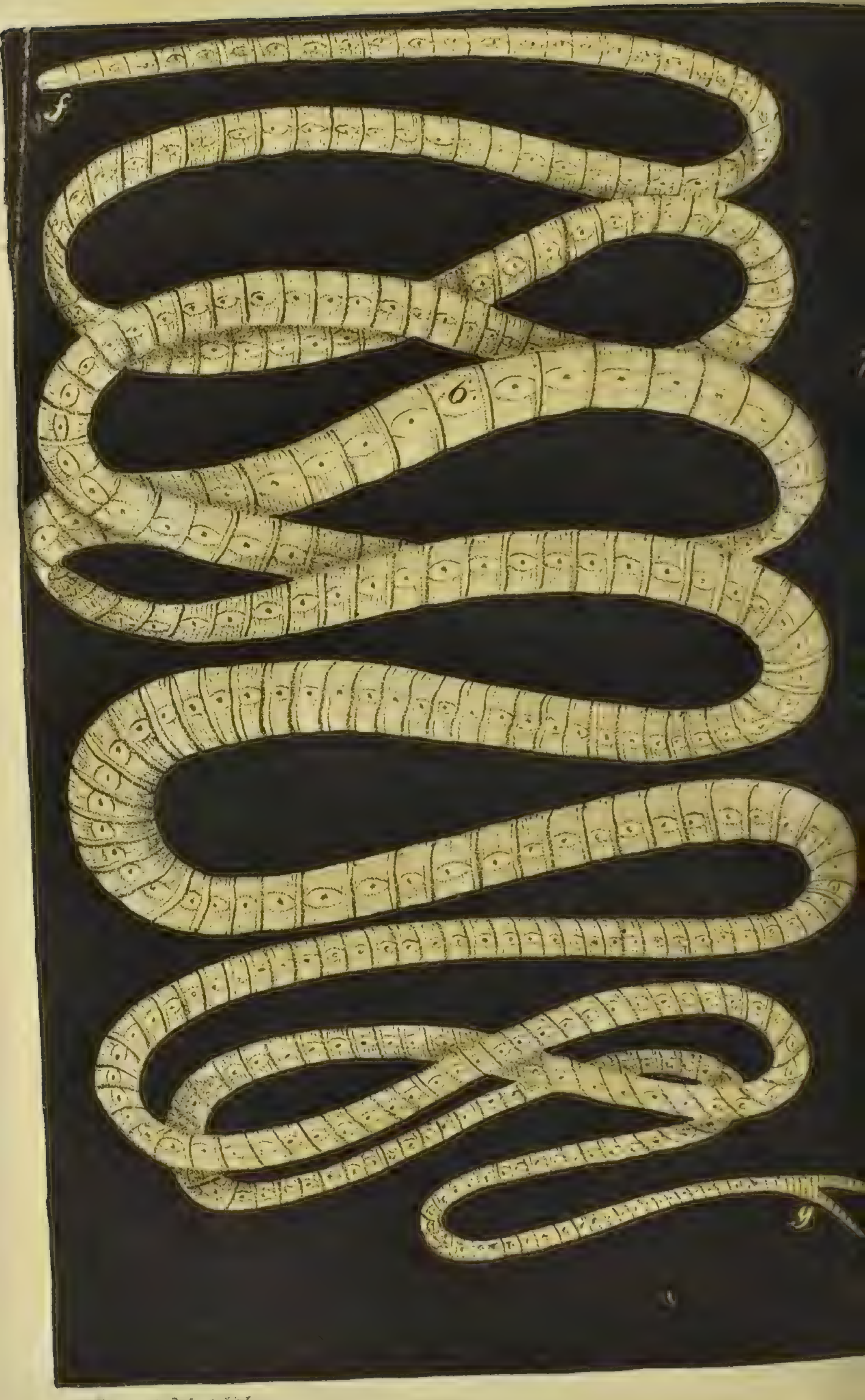
* Consult Redi, *de Animalculis Vivis quæ in corporibus Animalium Vivorum reperiuntur*, 1708. Latreille, *Fam. Nat. du Regne Animal*, 1805. Clerc, *Hist. Nat. et Med. Latorum Lumbricorum*, Geneva, 1715. J. A. Goeze, *Versucheiner Naturzeschichte der Eingeweidewurmer Thierischer Körper*, Blackenburg, 4to. 1782. Pallas, *Diss. Inaug. de Infestis Viventibus Viventia*, Lug. Bat. 1760. Bloch, *Abhandlang von der Enzegung der Eingeweideurmer, und dein Mittlen wider Diselben*, Berlin, 4to. 1782. Zeeder, *Systema Entozoorum*, 1800. Werner, *Intestinalium presertim Teniæ Humanæ, brevis expositio*, 1 vol. 8vo. Leipsic, 1782, 1788. Modeer, *Bibliotheca Helminthologica*, Erlang. 1786. Muller, O. F. *Von Wermern des Sussen und Salzingen Wassers*, 4to. Copenhagen, 1771. Bruguiere, in the art. *Vers*, in the *Ency. Methodique.* C. A. Rudolphi, *Entozoorum, sive Verm. Intest. Hist. Nat.* 1808; and *Entozoorum Synopsis*, Berol. 1819. Bremser, *Traite Zoologique et Physiologique sur les Vers Intestinaux*, par M. de Blainville, 8vo. Paris, 1821; and *Icones Helminthum*, fol. Vienna, 1824. Rhind, *Treatise on the Nature and Cure of Intestinal Worms.* Hooper, in the *Memoirs of the London Medical Society*, vol. vi.



G. Spratt. del. et lith.

1. Trichocephalus dispar. male, nat. size.
2. The same mag.d c the head, d the tail.
3. Oxyuris vermicularis; fem. 4. male; c. mag.d

Pub. by J. Wil

Printed by G E. Madeley. Wellington S^t.

5. Ascaris lumbricoides, with the head mag^d.
6. Bothriocephalus latus, f. head; g. tail.
7. Head of Tænia solium with articulations. 8. 9. Head of Tænia solium mag^d.

...ces S^t. Dec. 1. 1831.

SPEC. CHAR. *Anterior capillary* part the longest; *head* pointed, indistinct; *body* of the *male* twisted in a spiral form.

Trichocephalus hominis; *Syst. Nat. Gmel.* p. 5037; *Goeze, Eingew,* p. 112, t. 6, f. 15. Trichocephalus dispar; *Rudol. Ent.* p. 16. Trichurus vulgaris; *Hoop. Mem. Lond. Med. Soc.* v. p. 252. Ascharis trichuria; *Wern. Verm. Intest.* p. 84.

La Trichiure de l'Homme, Fr.; *Der Peitschenwurm*, Ger.

THIS Worm, when full grown, is about two inches in length, and of a pale yellowish colour. The anterior end is capillary and double the length of the posterior, terminating in an acute point, where the mouth is situated. The posterior part is thick, and swells out to a considerable size; and in the male it is twisted round in a spiral form. Each sex is in a different individual; the alimentary canal is straight, and around it lie the organs of generation. The female is distinguished from the male by having a somewhat larger anterior part, and from the posterior end being rarely found bent. The Trichocephalus or hair-headed worm, was formerly called *trichurus*, or hair-tailed, the head having been mistaken for a tail. This species was first discovered in 1761, by Rhœder, at Göettingen, in the bodies of some French soldiers who had died of a contagious disease. It is found chiefly in the cœcum; is generally numerous, and much more common in infants. Rudolphi found more than a thousand in one individual.

OXYURIS VERMICULARIS,

The Maw, or Thread-Worm.

PL. XXIX. *fig.* 3, 4.

Order NEMATOIDEA, *Rudolphi.*

GEN. CHAR. *Body* round, elastic; *posterior part* of the *female* awl-shaped; *mouth* orbicular; *penis* in a sheath.

Spec. Char. *Head* blunt; *tail* of the *male* convoluted, obtuse; of the *female* awl-shaped straight.

Ascaris vermicularis; *Syst. Nat. Gmel.* p. 3029; *Hoop. Mem. Med. Soc.* v. p. 245; *Rudolp. Entoz.* p. 44. Oxyure vermiculaire; *Lamar. An. sans Vert.* t. 3, p. 104. *L'Ascarides*, Fr.; *Der Afterwurm*, Ger.; *Barnmask*, Swed.

The Thread-Worm, commonly known as the *ascaris*, is a small species, the female being four or five lines in length, and the male only a line or a line and a half. The body is thread-like, very elastic, and of a faint yellow colour. The posterior end is convoluted in a spiral form, and the organization is the same as in the preceding species. They inhabit the intestines of children, even of those newly born, especially the rectum; they sometimes crawl out upon the thighs, and enter the vagina, the bladder, and the urinary passages. Goeze, Hooper, and others, maintain that the oxyures are viviparous; while Rudolphi and Bremser are of opinion that they are oviparous.

To expell the Thread-worm, colocynth, scammony, gamboge, aloes, calomel, jalap, and indeed almost all the active and drastic cathartics are occasionally employed. They are very readily destroyed for a time by bitter and oily injections; and their future generation may be prevented by keeping up a regular action of the bowels, by change of diet, by the use of powerful bitters, as rue, tansy, and wormwood, together with whatever tends to strengthen the general system.

ASCARIS LUMBRICOIDES.

The Long Round Worm.

Pl. XXIX. *fig.* 5.

Order Nematoidea, *Rudolphi.*

Gen. Char. *Body* round, elastic, and attenuated at each end; *head* with three valves; *penis* bifurcated.

SPEC. CHAR. *Body* naked; with a small groove or longitudinal depression on each side; *tail* obtuse.

A. lumbricoides, *Syst. Nat. Gmelin.* p. 3029. *Hoop. Mem. Med. Soc.* v. p. 233. *Rudolph. Entoz.* p. 37, 267. *Wern. Verm. Intest.* p. 75. t. 7. f. 153, 159. *Lombricdes Intestines*, Fr.; *Verme Rondo Cambrico*, It.; Lombrig. Sp.; *Rundwurm*, Ger.; *Menneskeorm*, Dan.; *Menisco-mask*, Swed.

THE Lumbricus *Teres*, or Round Worm, is about the thickness of a goose-quill, and from twelve to fifteen inches long. It is generally of a brownish-red colour; but it varies considerably according to the nature of the aliment with which the animal is filled. When recently passed they are quite transparent, and the viscera and organs of generation may be seen through the integuments; but on exposure to the air, they soon assume a light and opaque yellow tinge. The head is distinguished from the rest of the body by a circular depression, and it is furnished with three tubercles or valves found in no other entozoa. In the centre of these tubercles is a small tube, which is the opening of the mouth. The body is cylindrical, tapering towards the two extremities, with a small groove or depression extending on either side, from the head to the tail. The animal has external integuments, muscles, digestive and genital organs, and according to some authors, even a circulating and nervous system.* The integuments consist of two distinct membranes, the cuticle which is thin, smooth, and transparent, and the cutis vera or true skin, which is somewhat thicker than the former, very strong, elastic, and transparent. The muscles lie throughout under the skin, and have longitudinal and transverse fibres. The digestive canal is straight, extending the whole length of the worm, and terminating by a transverse fissure in the anus, near the extremity of the tail; each sex is in a different individual. The male is smaller than the female, and is distinguished from the latter by having the end of the tail bent. The organs of generation are situated near the anus, and in the female fill a great part of the animal. It resembles in its general aspect the common earthworm, but is readily distinguished from it by the want of setæ or

* See *Anatomie des vers Intestinaux, par* Jules Cloquet, Paris, 1824.

feet-like processes along the sides, by its being less fleshy, by the very slender rings round it, and by its being oviparous. These worms are usually found in the small intestines, particularly in the jejunum and ilium; but as they escape from these, they are sometimes met with in the larger, in the stomach, œsophagus, pharynx, and mouth. A case is mentioned by Andral, where they caused sudden death by getting into the larynx. They are also reported to have sometimes penetrated into the gall-bladder and ductus communis choledochus, and have perforated the intestine, escaping into the cavity of the abdomen, bladder, vagina, and even through the parities of the abdomen; but this has almost always happened after death. They are most common in children, and more rare as age advances. A few instances occur of its being solitary. In the generality of cases, there are from thirty to forty, and Dr. Hooper knew a girl, eight years of age, who voided, *per anum*, upwards of two hundred in the course of a week. The celebrated Dr. Peter Frank, of Vienna, also mentions a case in which the intestines were crammed full of them. The Geoffroya *inermis*, or cabbage-tree bark, given in powder or decoction, has been strongly recommended for the expulsion of the round worm. It is, however, very easily got rid of, by any brisk purgative.

BOTHRIOCEPHALUS LATUS.

The Broad Tape-Worm.

PL. XXIX. *fig.* 6.

Order CESTOIDEA, *Rudolphi.*

GEN. CHAR. *Body* elongated, depressed, articulated; *head* sub-quadrangular, with two and sometimes four depressions.

SPEC. CHAR. *Head* and *marginal fossets* oblong; *anterior articulations* striated, the next very short, sub-quadrate, broader; the last *articulations* the longest.

...ratt del et lith.

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1. Filaria Medinensis.
2. Strongylus gigas; a, the tail; b, the head.
3. Distoma hepaticum, nat. size; c. mag.d
4. Echinococcus hominis: c. mag.d
5. Larva of Tenebrio obscurus.
6. Larva of Oestrus bovis.
7. Larva of Helophilus pendulus.
8. Larva of Oestrus hæmorrhoidalis.

Tænia vulgaris; *Syst. Nat. Gmelin*, p. 3067. Tænia lata; *Goeze, Eingew.* s. 290, f. 8. Tænia osculis superficialibus; *Hoop. Mem. Med. Soc.* v. p. 276. Le Bot de l'Homme; *Lamar. An. sans. Vert.* iii. p. 167; *Rudol. Entoz.* p. 136.

Le Ver Flat, Fr.; *Der Breit Bandwurm*, Ger.

THE flattened, or riband-like entozoa, usually denominated Tape-worms, consist of a series of articulations, each with lateral pores. In the *bothriocephalus*, or broad Tape-worm, the articulations are generally broader than long, of an oblong square form, and studded with minute papillæ. On the flattened surface, near the edge of each of these joints, there is one or two small round openings or pores, surrounded by the oviducts, which are disposed in the form of a star. The anterior part is oblong, and furnished with two and sometimes with four oval depressions, in the centre of which is the mouth or opening into the alimentary canal. The tail is generally round and simple, but sometimes bifurcated. It is usually from three to fifteen or twenty feet in length, of a dirty white colour, and occurs, either solitary, or in parties of three or four in the same individual. It infests the small intestines of the inhabitants of Poland, Russia, Switzerland, and some parts of France, but is rarely found in this country.

TÆNIA SOLIUM.

The common Tape-Worm.

PL. XXIX. *fig.* 7, 8, 9.

Order CESTOIDEA, *Rudolphi.*

GEN. CHAR. *Body* elongated, compressed, articulated; *head* with four *oscula* or suckers.

SPEC. CHAR. *Head* sub-hemispherical; *rostrum* obtuse; *articulations* longitudinally wrinkled, those next the neck very short, becoming broader towards the tail;

middle joints quadrangular, the others oblong; *marginal pores* sometimes on one side, sometimes on the other.

Tænia solium; *Syst. Nat. Gmelin*, p. 3062. *Goeze, Eingew.* s. 269, t. 21, f. 1, 7, 9, 12. *Trans. of Lin. Soc.* ii. p. 217. T. cucurbitina; *Pallas, Elench. Zoophyt.* p. 405. T. osculis marginalibus; *Hoop. Lon. Med. Soc.* v. p. 257. Der Kurbisbandwurm; *Batsch, Bandwurmer*, s. 117, f. 1, 6, 9, &c. *Rudol Entoz.* p. 162, 522.

THIS species is distinguished from the preceding by the more irregular form and structure of its articulations, which are transverse, oval, rhomboidal, or somewhat quadrangular, wrinkled transversely, and having the marginal pores placed sometimes on one side, sometimes on the other. The mouth is situated on the anterior part of the head; it is a small orifice, and when viewed with a microscope exhibits a projecting margin, surrounding an excavation of a striated appearance. On the head there are four orifices, which are supposed to be suckers, by which the worm adheres so closely to the coats of the intestines that it resists the most violent medicines. On the margin of each joint is situated one, rarely two, small openings or pores, on one side only, or on the opposite side of each succeeding joint throughout the whole length of the animal. The alimentary canal commences at the mouth by a simple tube, that divides into two branches near the basis of the proboscis, which proceed near the margin of the worm to the other extremity. Each joint is composed internally of two distinct sets of vessels—the alimentary canal and the ovaria; the ovaria, which contains the eggs, are generally filled with an opaque whitish fluid, resembling chyle.* These worms are supposed to be hermaphrodite; but the sexual organs have not been observed. This, like the Bothriocephalus, is much more frequent among adults than in children, and is the species most common in Britain. It occupies the small intestines, particularly of females, and feeds on the chyle. It may be voided in lengths of several yards, or in numerous fragments or detached joints, which, from resembling gourd seeds, are by the common people called *gourd-*

* See Rhind's *Treatise on the Nature and Cure of Intestinal Worms*, p. 73.

worms. By some, as Blumenbach and Sir A. Carlisle, these articulations, when separated from the body, are conjectured to become distinct animals. This species was formerly imagined to be solitary, and from this circumstance has been called the tænia *solium.* It is now, however, ascertained to be gregarious, two or three being generally found in the same individual.

The oil of turpentine, given in doses from half an ounce to two ounces, is undoubtedly the most effectual remedy we possess for directly removing worms. Dr. George Gregory says it may be *safely* given even to children in the quantity of six drachms, in milk or mixed with water, either by means of mucilage or honey,* Dr. Bremser considers the empyreumatic oil of Chabert as the most effectual remedy for intestinal worms, and especially for tape worms.†

Div. II.—*Worms that inhabit other structures and cavities of the body.*

FILARIA MEDINENSIS.

The Guinea-Worm.

Pl. XXIX. A. *fig.* 1.

Order Nematoidea, *Rudolphi.*

Gen Char. *Body* round, elastic, entirely filiform; *mouth* orbicular; *penis* simple.

Spec. Char. *Body* very long, filiform, smooth; *tail* pointed, inflexed.

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* *Elements of the Theory and Practice of Physic*, 3d ed. p. 535.

† *Huile Empyreumatique de Chabert.* Take of empyreumatic oil, from hartshorn, one part, oil of turpentine three parts, mix them in an iron retort, and distil in a sand bath, until three-fourths come over. The distilled liquor is then to be put into small bottles, and carefully excluded from the air and light, to prevent its decomposition. Dose—Two tea spoonfuls morning and night in a glass of water.

Filaria Medinensis; *Syst. Nat. Gmelin*, p. 5039. *Rudolph. Entoz.* p. 1; *Sloane, Jam.* ii. p. 190, t. 233, f. 1.

Dragoneau, Fr.; *Fadenwurm*, Ger.; *Naroo*, Hind.

The Guinea-worm occurs only amongst the inhabitants of Africa and the southern parts of Asia. It is of white colour, of the size of a violin string, tapering a little at the tail, which is slightly curved, and grows to the length of several feet. It is found only in the cellular tissues below the integuments, most frequently of the lower extremities, but may be also found in all the other parts of the body, exciting intolerable itching in the part, swelling, pain, suppuration, and fever. It is generally coiled up circularly, and may easily be felt on pressure being made with the fingers. The filaria differs from Gordius, or the *hair-worm*, with which it has been sometimes confounded, in its abode, and its tail not being hooked. The usual remedies are stimulating liniments, the internal use of mercury, bleeding, cathartics, and when suppuration has commenced, the frequent application of emollient poultices and warm fomentations. When the tumour breaks, and the head of the worm protrudes, it is to be laid cautiously hold of and gently pulled, day after day, until the whole is extracted.

STRONGYLUS GIGAS.

The Large Strongyle.

Pl. XXIX. A. *fig.* 2.

Order Nematoidea, *Rudolphi.*

Gen. Char. *Body* round, elastic, tapering at each extremity; *mouth* round or angular; *male* organ of generation at the end of the tail?

Spec. Char. *Body* elongated; *mouth* fringed at the margin with six small papillæ; *tail* of the male bifid, in the female obtuse.

S. gigas; *Rud. Entoz.* p. 31, 260. Le Strongle des Reins; *An. sans Vert.* iii. p. 202.

This species is found in the kidneys, and has been passed frequently by the urethra, causing symptoms of great irritation in the urinary organs and bladder. It is also met with in many of the lower animals; in dogs, oxen, horses and sheep. It varies in length from five inches to three feet, and in diameter from two to six lines. The body is slender, cylindrical, tapering towards each extremity, and composed of annular rings. The head or anterior part of the animal is globular and truncated, with a circular aperture, furnished with six minute papillæ. The female is larger than the male.

DISTOMA HEPATICUM.

The Liver Fluke.

Pl. XXIX. A. *fig.* 3.

Order Trematoda, *Rudolphi.*

Gen. Char. *Body* soft, rounded or compressed; *anterior opening* single.

Spec. Char. *Body* obovate, flat; *neck* very short; *posterior opening of the belly* large and slightly prominent.

Fasciola humana; *Syst. Nat. Gmelin*, p. 3085. Fasciola hepatica; *Joerdens, Helminth.* t. 7, f. 13, 14. *Rudol. Entoz.* p. 92, 363.

Fasciole Hepatique, Fr.; *Bisciuola*, It.; *Caracolillos*, Sp.; *Leberdoppelloch; der Leberwurm*, Ger.; *Lever Mask*, Swed.

This species is found in the gall-bladder, and Dr. Bremser supposes also in the human liver. It is very common in sheep, generally found adhering by a pore at the extremity and another at the end of the abdomen, and is said to cause the disease called the *rot* in these animals. It is three or four lines in length, of an oblong ovate shape, obtuse at each extremity, and of a dirty whitish or brown colour.

ECHINOCOCCUS HOMINIS.

The Hydatid.

Pl. XXIX. A. *fig.* 4.

Order Cystica, *Rudolphi.*

Gen. Char. *Body* ovate, vesicular, containing a fluid which is generally transparent, inclosed by a capsule; *head* furnished with retractile hooks, or crotchets, and suckers as in the *tænia.*

Polycephalus hominis ; *Joerdens, Helminth,* t. 7, f. 21, 22 L'Echinocoque de l'homme, *Lamar. An. sans. Vert.* iii. p. 157. E. hominis; *Rudol. Entoz.* p. 183, 551.

"The Hydatid," says Mr. Rhind, "is a spherical body, consisting of one and sometimes of two membranes, enclosing a fluid most commonly limpid and transparent, but which is sometimes found of a tough, hard, and opaque consistence. On the inner coat of the membrane are attached a number of small granular bodies, which are called the *echinococci.* Rudolphi divides the hydatids into *viventes* and *non viventes.* He denies the vitality of the hydatid, properly so called, and supposes that the small granular bodies, or echinococci only, which cover the internal surface of the membrane, are endowed with life. Bremser, on the other hand, is of opinion, that the vesicle is a distinct animal, and that the small granulations on its internal surface are hydatids in miniature, which, gradually enlarging, and detaching themselves from the parent covering, become in their turn independent ani-

mals. Hydatids have been found in all the textures and cavities of the human body, except the intestinal canal." They are very common in sheep, oxen, and in pigs, when the pork is vulgarly denominated *measley*.

Ectozoa.—With respect to the Ectozoa, it may be remarked, that they are usually the *larvæ* of various species of insects, which find their way into the body, and are often discharged in a living state. It is well known that the larvæ of the Tenebrio *Molitor,* and T. *Obscurus,* or meal-beetle, (Pl. XXIX. A. fig. 5.) has often been voided, either by the mouth, or *per anum,* and in one instance is said to have occasioned death.* Dr. Martin Lister mentions an instance of a girl who vomited up three hexapod larvæ, similar to what are found in the carcases of dead birds, which is supposed to have been either the genus *Dermestes* or *Anthrenus*†. The larvæ of some insect, probably belonging to the genus *Œstrus,* or gad-fly, have been discharged from the maxillary and frontal sinuses. In South America, according to Humboldt, a species of gad-fly, the Œstrus *hominis,* of Gmelin, deposits its eggs in the skins of man, causing there painful tumours; and in this country the gad-fly of the ox (Œstrus *bovis*) has been known to oviposit in the jaw of a woman, and the bots (Pl. XXIX. A. fig. 6.) produced from the eggs finally caused her death‡. The larvæ of the common cabbage butterfly (Pontia *brassicæ*) has frequently been discharged from the stomach and bowels; and Linneus tells us that the caterpillar of a moth (Aglossa *pinguinalis*), common in houses, has been likewise found in a similar situation. The larvæ of Helophilus *pendulus,* (Pl. XXIX. A. fig. 7), a fly peculiarly formed by nature for inhabiting fluids, has been found in the human stomach.§

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* Tulpius, *Obs. Med.* l. ii. c. 51, t. 7, f. 3. *Edin. Med. and Surg. Jour.* No. 35, 42, and 48. Derham, *Physic. Theol.* 378. Lowthrop, *in Phil. Trans.* iii. 135. Pickells, *Trans. of the Coll. of Phys. in Ireland*, iv. art. vii. 1124.

† *Phil. Trans.* 1665, x. 391.

‡ Clarke, *in Lin. Trans.* iii. 323, note.

§ *Phil. Mag.* ix. 366.

Class XIII.—ZOOPHYTA.

Aquatic animals of a plant-like form, generally compound, and fixed by their base; mouth surrounded by a circle of tentacula or cilia, for attracting and seizing their prey; digestive organs consisting of numerous small superficial sacs, termed polypi; no distinct organs of sense, nor trace of a nervous, muscular, or circulating, system; body for the most part supported by an axis or skeleton, composed of cartilaginous, horny, calcareous or silicious substance.

SPONGIA OFFICINALIS,

Officinal Sponge.

Pl. XXX. *fig.* 3.

Order Carnosa. *Family* Spongiadæ.

Gen. Char. *Polypiferous mass* fixed, soft, gelatinous, tenacious, very flexible; the *cartilaginous matter* supported by calcareous or siliceous spicula; *pores* very numerous, irregular.

Spec. Char. Sessile, subturbinated, rounded, slightly convex above, soft, tenacious, with wide pores; *foramina* large.

Spongia officinalis; *Lin.?* Spongia communis, *Lamar. Hist. Nat. des Anim. sans Verteb.* ii. p. 353.

Eponge commune, Fr.; *Spugna*, It.; *Esponga*, Sp.; *Der Saugeschwamm*, Ger.; *Bodiaga*, Russ.; *Isfunge*, *Arab.*

The common Sponge is universally known from its utility in various domestic purposes. It is a soft, light, very porous, elastic,

and compressible substance, readily absorbing any fluid in which it is immersed, and again yielding it up on being compressed. It grows into irregular lobes of a woolly consistence, and is found generally adhering by a broad base to submarine rocks. "When," says Mr. Bingley, "sponge is cut perpendicularly, it is found to consist internally of numerous small anastomosing tubes, which divide into branches as they appear on the surface of the sponge, and ending in the outside in an infinite number of small holes, which are the proper mouths of the animal. Each of these holes is surrounded by a few erect pointed fibres or little spines. The tubes in the living state of the sponge, are filled with a gelatinous substance, which may be called the flesh of the animal."

Sponge is found in the Indian, American, and Norwegian seas; it is an object of commerce in the Mediterranean, and in several of the islands of the Grecian Archipelago. Sponge yields, on analysis, an animal gluten, albumen, carbonate of lime, some traces of phosphate of soda, carbonate of ammonia, and ioduret of iron.

Uses.—Sponge, in its unprepared state, is frequently employed in surgery as a compress for suppressing hæmorrhages, and for absorbing the acrid discharge from ulcers. Prepared Sponge is sometimes used as a tent for dilating sinuses and small openings. For this purpose the sponge is immersed in melted wax, and subjected to pressure between two iron plates. As soon as cold, the substance thus formed may be cut into pieces of any shape, so as to be introduced where necessary. From the melting of the wax, in consequence of the heat of the part, the Sponge gradually expands, and thus distends the opening. Burnt Sponge has been celebrated as a remedy in bronchocele, scrofulous affections, herpetic eruptions, and in cases of chronic enlargement of the prostate gland. Dr. Thompson assures us he has witnessed its efficacy in scirrhous testicle, when given in combination with cinchona bark. In bronchocele, it is said to be most effectual when given in the form of electuary and lozenge, and allowed to dissolve slowly in the mouth. The mode of its operation has not been hitherto ascertained. By some, the virtues of burnt sponge are supposed to reside in the alkali, or in the charcoal which it contains; and later

theorists seem to regard iodine as its active principle. It may be given in a dose from ℥i. to ℥iii. mixed with some aromatic.

Off. Prep.—Spongia usta, L. D.

CORALLINA OFFICINALIS.

Officinal Coraline.

Pl. XXX. *fig.* 1.

Order Corticifera, *Lamarck*. *Fam.* Corallinadæ.

Gen. Char. *Polypiferous mass* fixed, much branched, composed of a central axis, and an interrupted incrustation; *axis* filiform, inarticulated, solid, cartalaginous or horny; *incrustation* calcareous, dense, united at the surface without distinct cells, interrupted and as if jointed longitudinally; *polypi* unknown.

Spec. Char. Trichotomous, greenish or redish coloured; *branches* pinnated; *pinnulæ* distichous, cylindrico-clavate, the terminal ones sub-capitate; *joints* of the *stem* and *branches* wedge-shaped, compressed.

C. officinalis; *Syst. Nat. Gmel.* 3838; *Mull. Zool. Dan.* 3056; *Ellis, Coral.* t. 24, n. 2, f. *a*. A. t. 8, f. 4; *Lamour. Polyp. Flexib.* p. 283; *Lamar. Anim. Sans. Verteb.* ii. p. 238; *Raii, Hist.* p. 65; *Dale, Pharm.* p. 112.

La coraline officinale ou blanche, Fr.; *Coralina*, It.; *Das Korallemos*, Ger.; *Koralmossa*, Swed.

The Officinal Coraline, placed in the class Zoophita, is a marine production, common on rocks and shells, in shallow water, on all our coasts. It resembles a small plant without leaves, consisting of several jointed branches, generally of greenish or reddish colour; and it appears, from the experiments of Professor Scheweigger, of Konigsberg, to be only a calcified vegetable. M. Lamouroux,

Drawn by Jeffrey

Engelmann & Co. lith

1. Corralina Officinalis. 2. Isis nobilis.

3. Spongia officinalis.

London. Published by John Wilson, July 1831.

however, has observed minute filaments projecting from the crust, which were retracted on the slightest agitation of the water.

This species of Coralline consists chiefly of an animal matter, which possesses the properties of coagulated albumen, and carbonate of lime. It was once in use as an antacid in calculous complaints, but is altogether inert, and is now entirely banished from British practice.

CORALLIUM RUBRUM.

Red Coral.

Pl. XXX. *fig.* 2.

Order Corticifera, *Lamarck.*

Gen. Char. *Polypary* fixed, plant-shaped, branched, not articulated, covered with a cortical crust; *axis* caulescent, branching, stony, solid, striated on the surface; *crust* soft and fleshy in the recent state, in which are the polypi; thick, porous, and reddish when dried; *polypi* with eight ciliated and radiated tentacula at the mouth.

Spec. Char. *Branches* cylindrical, bright red, rose-coloured, or whitish.

Κουραλλιον et Κοραλλιον; *Theophr. Diosc.* v. 139. Curalium et Gorgonia, *Plin.* Isis nobilis; *Syst. Nat. Gmelin*, p. 3805. Gorgonia nobilis; *Soland.* and *Ellis.* t. 15. Corallium rubrum; *Raii, Hist.* i. p. 66; *Bauh. Pin.* p. 366; *Aldrov. Mus. Metall.* 290; *Gans. Hist. Corall. Francof.* 1669; *Lamour. Polyp. Flex.* p. 456; *Lamar. Anim. sans Verteb.* ii. p. 297.

Red Coral, the Isis *nobilis* of Linneus, is principally found in the Indian and Mediterranean Seas, and forms an important article of commerce.* Its general appearance is that of a small shrub,

* See Poiret's *Voyage en Barbarie*, and Spallanzani's *Travels in the Two Sicilies, &c.* vol. iv. p. 308.

divested of its leaves, being usually about two inches in diameter at its base, and seldom exceeding three feet in height. The axis or central portion is stony, solid, with a vitreous fracture, and of a bright crimson colour. In the recent state, the stem and branches are covered with a soft cortical substance or epidernus, which is the habitation of numerous small, whitish, soft, semi-transparent polypi. The coral is said to be fixed, by its base, to submarine rocks and other solid bodies, always in a pendant or reversed position.

According to the analysis of M. Vogel, the components of Red Coral are 27·50 of carbonic acid, 50·50 of lime, 3·00 of magnesia, 1·00 of oxide of iron, 5·00 of water, 0·50 of animal matter, 0·50 of sulphate of lime, with a trace of muriate of soda.* Though it has been regarded as an antacid, and as such was at one time used in medicine, it does not appear to possess any advantages over other calcareous productions, and is now discarded from the British pharmacopœias. It was also considered a powerful tonic, and extolled as a remedy against disorders of the most opposite kinds. The Roman ladies suspend it round their neck, as a charm to ward off diseases, and other evils, to which infancy is subject. Gansius, who has written very fully on its properties, in his "Corallium Historia," thinks it an admirable remedy against demoniacal possession; and in this notion he is supported by Marbodæus.

Fulmina, Typhones, Tempestatesque repellit
A rate vel tecto * * * *
Umbras, dæmoniacas, et Thessala monstra repellit
Collo suspensus pellit de ventere dolorem.

De Lapidibus pretiosis, xx.

The use of red Coral is now confined to ornaments of dress, and for these it is as universally employed as in the days of Pliny.

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* *Annales de Chimie*, lxxxix. p. 113.

Besides the animal substances already considered, there are others generally enumerated by writers on the materia medica and toxicology. Thus the *Phosphate of Soda*, used in medicine as a cathartic, is procured by a complicated process from the burnt bones of quadrupeds; and *Phosphoric Acid*, which enters into many chemical compounds, and from which that remarkable inflammable substance phosphorus is obtained, is procured by a chemical from animal substances. Empreumatic animal oil which has been employed as an antispasmodic and vermifuge, is obtainad by distillation from the bones and horns of animals. The basis of Sal Ammoniac, or *Muriate of Ammonia*, which is used internally as a diuretic and diaphoretic, and externally as a discutient to indolent tumours, is procured by distillation from the urine and bones of animals. And *Prussic Acid*, the most powerful of all narcotic substances hitherto discovered, is obtained from animal matter, in a state of putrefaction.*

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* For a full account of the medical properties and uses of *Prussic Acid*, see *Medical Botany*, vol. iii. art. 117.

PART II.—THE MINERAL KINGDOM.

Order I.—METALLIC MINERALS.

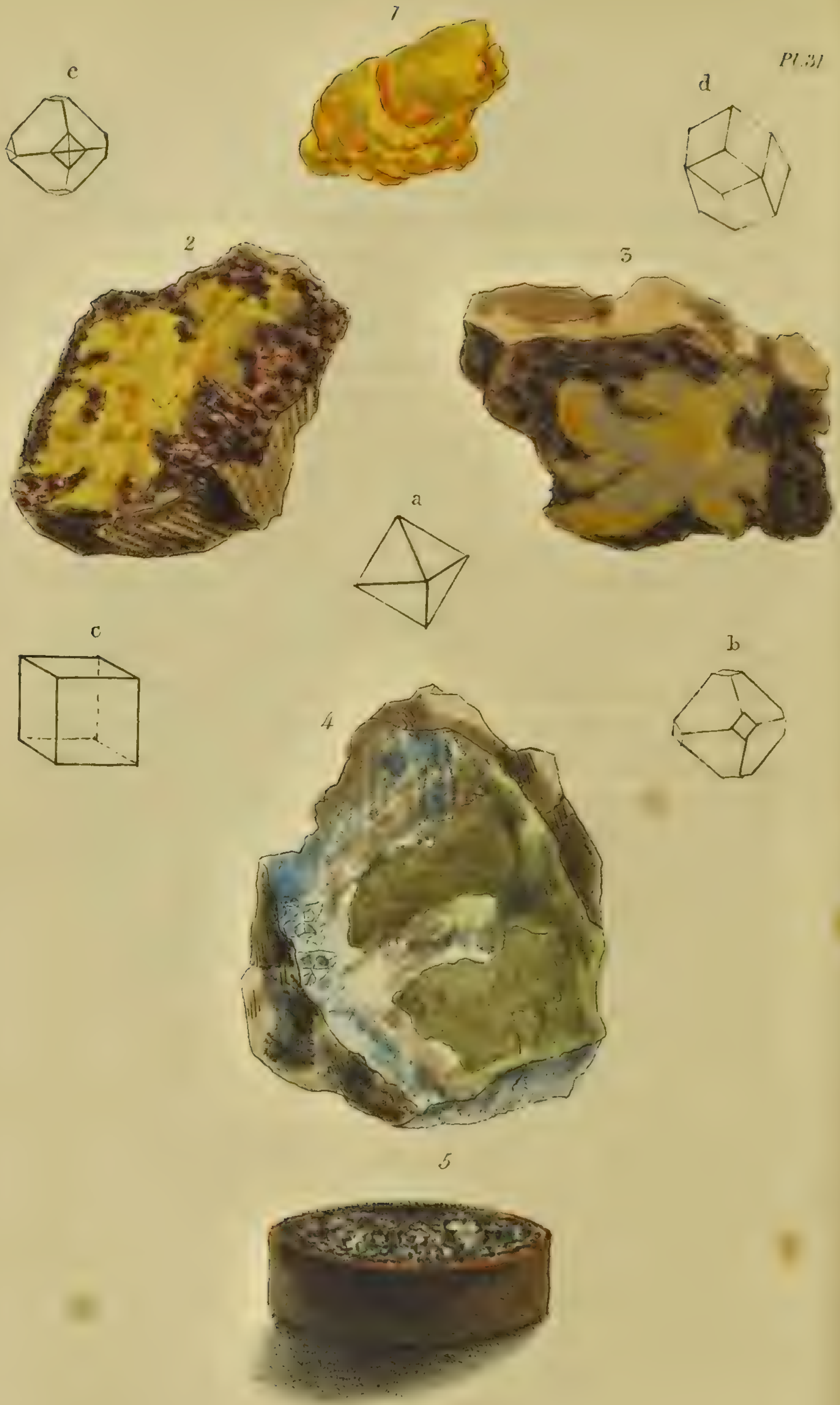
This order includes all metals that are found either in a pure state, or combined with other substances forming *metallic ores;* in the former case they are said to be *native*, and in the latter they are said to be *mineralized.* In general they are combined with sulphur, with oxygen, or with acids, and they are sometimes found alloyed with other metals. The metals and metallic ores are distinguished by their bright colours, their peculiar lustre, their opacity, their hardness, and their great specific gravity, which exceeds that of the minerals of the other classes.*

Genus I.—GOLD.

Or. Fr.; *Gold*, Ger.; *Gould*, Swed. Dan.; *Arany*. Hung.; *Soloto*, Russ.

The first of the mineral substances which we have to notice, is Gold. This metal was known to the ancients, and appears to have been as highly prized, on account of its scarcity, beauty, ductility, and indistructibility, in the time of Moses, as at the present day.

* With respect to specific gravity, as a character of the metals, it may be proper to observe, that the recently discovered *alkaline* and *earthy metals*, or the metallic basis of the alkalies and earths, are distinguished by their great levity, many of them being lighter than water.



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1. 2. 3. Native Gold.

4. Argentiferous Gold, or Electru

5. Native Platina.

London. Published by John Wilson July 1831.

It is probable, as Mr. Bakewell justly observes, that gold and silver were, in the earliest ages of civilized society, the only metals used by mankind, as they are the only metals that exist in any considerable quantities in a native state, on or near the surface of the earth ; hence originated the tradition of the golden, the silver, and the brazen ages. Gold is characterised by its fine yellow colour, its easy fusibility, and its great specific gravity, which, except platina, exceeds that of all known minerals. It exists only in the native or metallic state, but is commonly more or less alloyed by other metals. It is distributed over almost every part of the known world, either in veins, in primitive, and the older secondary rocks, or disseminated through the sands of rivers in loose grains and detached masses. Next to iron and manganese, it is probably the most generally diffused metal. The greatest part of the gold of commerce, usually called gold-dust, is obtained by washing the sands of rivers in South America and Brazil. Rich mines of gold were formerly wrought in the province of Gallicia, in Spain ; but the most considerable mines in Europe, at present, are those of Transylvania and Hungary.

Sp. 1. Hexahedral, or Native Gold. Pl. XXXI. fig. 1, 2, 3. —Aurum, *Plin. Hist. Nat.* cap. iv. p. 593; Gediegen gold, *Werner*; Hexaedrisches Gedigen gold, *Mohs.*; L'Or natif, jaune d'Or, *Broch.* ii. p, 89; *Hauy*, 374; Native gold, *Jameson, Syst.* iii. 2d ed. p. 8; *Sowerby, Brit. Min.* i. p. 112 t. 52.—Its colour is bright yellow, orange yellow, in some varieties passing into yellowish-grey. It occurs in grains and in small rounded or angular pieces, (fig. 1,) and sometimes in masses weighing several pounds ; it is also found regularly crystalized, in reticular plates, foliated, (fig. 2 and 3,) capillary, ramified, and pulverulent. The crystals are octahedrons, tetrahedrons, rhomboidal, dodecahedrons, double eight-sided pyramids, and cubes, variously modified. Some of the most common forms are represented Plate 31 : thus, fig. *a*, represents the regular octahedron ; fig. *b*, the same, having the solid angles replaced by square planes, forming the passage into the cube, fig. *c*. Fig. *d*, represents the rhomboidal dodecahedron, and fig. *e*, an octahedron, of which each solid angle is replaced by four triangular planes. As it does not possess a lamellar structure,

the primitive form has not been determined. The fracture is fine hackly. It is soft, difficultly frangible, and malleable. The lustre is splendent, and it does not tarnish on exposure to the air. The specific gravity varies according to the quantity of alloy it contains, from 12 to 19 or 20. It is sometimes nearly pure, but is generally alloyed with small portions of silver and copper. It is distinguished from *native copper* by its greater density, and insolubility in nitric acid; and from *copper pyrites*, and *iron pyrites*, by its specific gravity and malleability.

Native gold occurs in veins, and disseminated in primitive and transition rocks, more particularly granite and porphyry. It is generally associated with quartz and felspar, and some of the ores of iron, copper, silver, lead, cobalt, antimony, and nickel. It occurs in gneiss and mica slate in Mexico; in the latter in Salzburg and the Tyrol; in quartz with needle ore, (acicular sulphuret of bismuth,) and also in hornblende rock, at Schlangenberg, in Siberia. In the Bannat it occurs filiform and disseminated in pale flesh red and greenish-white limestone, with white cobalt ore and copper nickel. In the mines of Nagyag and Offenbauch, in Transylvania, it principally occurs in clay-porphyry, greywacke, and greywacke slate. Gold is most commonly found in alluvial deposits among sand in the beds of rivers, derived from the disintegration of rocks in which it formerly existed. It is fonnd in large quantities in the rivers and alluvial soil in many parts of Africa, Brazil, Mexico, and Peru; sparingly in the sands of the Danube, the Rhine, and other European rivers. It is occasionally found in the stream works in Cornwall; in alluvial land in the mining district of Leadhills, in Scotland, where, in the reign of Queen Elizabeth, extensive works were carried on for the purpose of collecting this precious metal. In the county of Wicklow, in Ireland, gold has been found in a ferruginous sand, in masses of considerable size. A rounded mass from this locality, in the collection of the British Museum, is represented Plate 31, fig. 1.

Sp. 2. Argentiferous Native Gold.—Electrum, *Plin. Hist. Nat.* lib. xxxiii. cap. iv. p, 524; Elecktrum, *Klaproth*, b. iv. s. 1. Its colour is pale brass-yellow, passing into silver-white. It seldom occurs massive, generally in small plates, dentiform, or

crystalized in imperfect cubes. Its constituents are, 64 gold, 36 silver=100. According to Klaproth, it is acted on neither by nitric nor nitro-muriatic acid. It occurs with massive heavy spar, on ash-grey splintery hornstone, at Schlangenberg, in Siberia.

Gold is generally separated from accompanying impurities by the process of amalgamation, similar to that described for extracting silver from its ores. After it has been freed by pounding and washing from stony matter, the ore is roasted, to disperse the volatile matter, and oxidize the other metals; it is then amalgamated with mercury. The more fluid part of the amalgam is forced through leather, and the remainder subjected to distillation, by which means the mercury is sublimed, and the gold remains in a state of fusion. When the gold is alloyed with silver, the latter metal is removed by parting and *quartation.* In quartation, one part of the gold is combined with three parts of silver—the object being to reduce the gold to a very minute state of division—and then exposing this compound previously rolled out into thin plates, to the action of boiling nitric acid, which oxidates and dissolves the silver, but leaves the gold in a pure state.

Pure gold is remarkable for its immutability on exposure to air and moisture, for its bright yellow colour, and for its exceeding ductility and malleability. A single grain of gold may be extended into a leaf which will cover 54¼ square inches, and not more than 1·283·000th part of an inch in thickness; excepting platina, it is the heaviest of all known metals, its specific gravity being 19·3. It melts at 32 of Wedgewoods' pyrometer, and at a very intense temperature it is volatalized; but it does not appoar to be oxidated by this process. Most metals unite with gold by fusion. None of the acids, except the nitro-muriatic, have any action on gold. A mixture of one part of nitric acid, and two of muriatic acid, has been long known under the name of *aqua regia,* from its power of dissolving this precious metal. Chromic acid added to the muriate, and aqueous chlorine, also dissolves gold. The solution of nitro-muriate of gold is of a fine reddish-yellow colour; it tinges animal substances of a deep purple colour; and when concentrated by evaporation, the chloride is slowly deposited in pyramidal crystals. The alkalies, most of the metals, the essential oils, ether, naphtha,

the sulphate of iron, and many other substances, cause its precipitation; ether, however, speedily redissolves it, forming a solution which is used for coating metallic substances with gold. If gold be heated in chlorine, in a state of minute division, a deep yellow coloured compound is produced, which, when dissolved in water, is a *chloride of gold;* and by adding a solution of potash to the chloride, a precipitate is formed, which is *oxide of gold.* If a plate of tin be immersed in a solution of muriate of gold, a purple powder is thrown down, which is much used for enamel painting, and for tinging glass of a fine red colour, a compound generally known as the *purple powder of Cassius.* The etherial solution of gold, or *aurum potabile,* which was at one time given internally as a medicine, is an inert compound of nitro-muriate of gold, ether, and some essential oil.

Salts of Gold.

METALLIC gold has no action on the human body; but some of the compounds, more particularly the chloride of gold and soda, have been occasinally used in medicine. The Salts of Gold are in general formed by digesting the oxides of gold in the acid with which they are to be combined.

CHLORIDE OF GOLD.—This is a compound of chlorine and metallic gold. It is prepared by dissolving pure beaten gold, cut in small pieces, in nitro-muriatic acid, concentrating the solution by evaporation, and then setting it aside to crystalize. The solution affords small prismatic crystals of a beautiful ruby-red colour; but they are so deliquescent, that they can only be preserved in close-stopped phials. The taste is astringent, and very disagreeable, and acts when taken into the stomach, even in very small doses, as a local irritant and corrosive poison. Three grains of the chloride injected into the veins of a very strong dog, occasioned the death of the animal; and the lungs were found, on dissection, so gorged with blood as to sink in water. The chloride of gold is regarded as a powerful stimulant and antisyphilitic. As an antisyphilitic it was employed as early as the 16th century, by Gabriel Fallopius; and it has been lately much extolled by M. Christen, in scrofula, bronchocele, herpetic eruptions, scirrhus, and even in tubercular

phthisis. The dose is from $\frac{1}{15}$ to $\frac{1}{8}$ of a grain, mixed with sugar or formed into a pill with crumb of bread. According to the French physicians, the best mode of exhibiting the salts of gold is by means of friction on the gums, and the chloride of gold and soda is the preparation which ought to be preferred.*

Chloride of Gold and Soda.—The following is the formula for preparing this salt, which is given by Mr. Faraday in the Journal of Science for 1816:—Dissolve 96 grs. of pure gold in nitro-muriatic acid, evaporate and crystalize; dissolve the crystals of the chloride of gold obtained in distilled water; add 30 grs. of decrepitated chloride of soda; evaporate the solution and crystalize. The crystals are long quadrangular prisms, of a fine yellow colour, which deliquesce on exposure to the atmosphere. The chloride of gold and soda may be used in the same manner and in the same cases as the oxide and chloride of gold. The dose is from $\frac{1}{15}$ to $\frac{1}{8}$ of a grain, mixed with a little refined sugar.

Ammoniuret of Gold.—This is a compound of ammonia and the oxide of gold. It is prepared by adding liquid ammonia to a solution of gold in nitro-muriatic acid, diluted with about three times its weight of water; a brown precipitate is formed, which, if carefully dried at a temperature of 212°, explodes violently when struck with a hammer, and is commonly called *fulminating gold.* It was formerly employed, in very minute doses, as a remedy in some convulsive diseases, particularly in chorea. When taken into the stomach in too large a dose, the ammoniuret of gold causes griping, diarrhœa, vomiting, great anxiety, fainting, convulsions, and sometimes has proved fatal.†

Genus II.—PLATINA.

This metal is found in grains and rolled pieces, alloyed with small portions of three other metals, viz. palladium, iridium, and

* Orfila, *Toxicologie Générale*, i. 593.

† Plenk's *Toxicologia.*

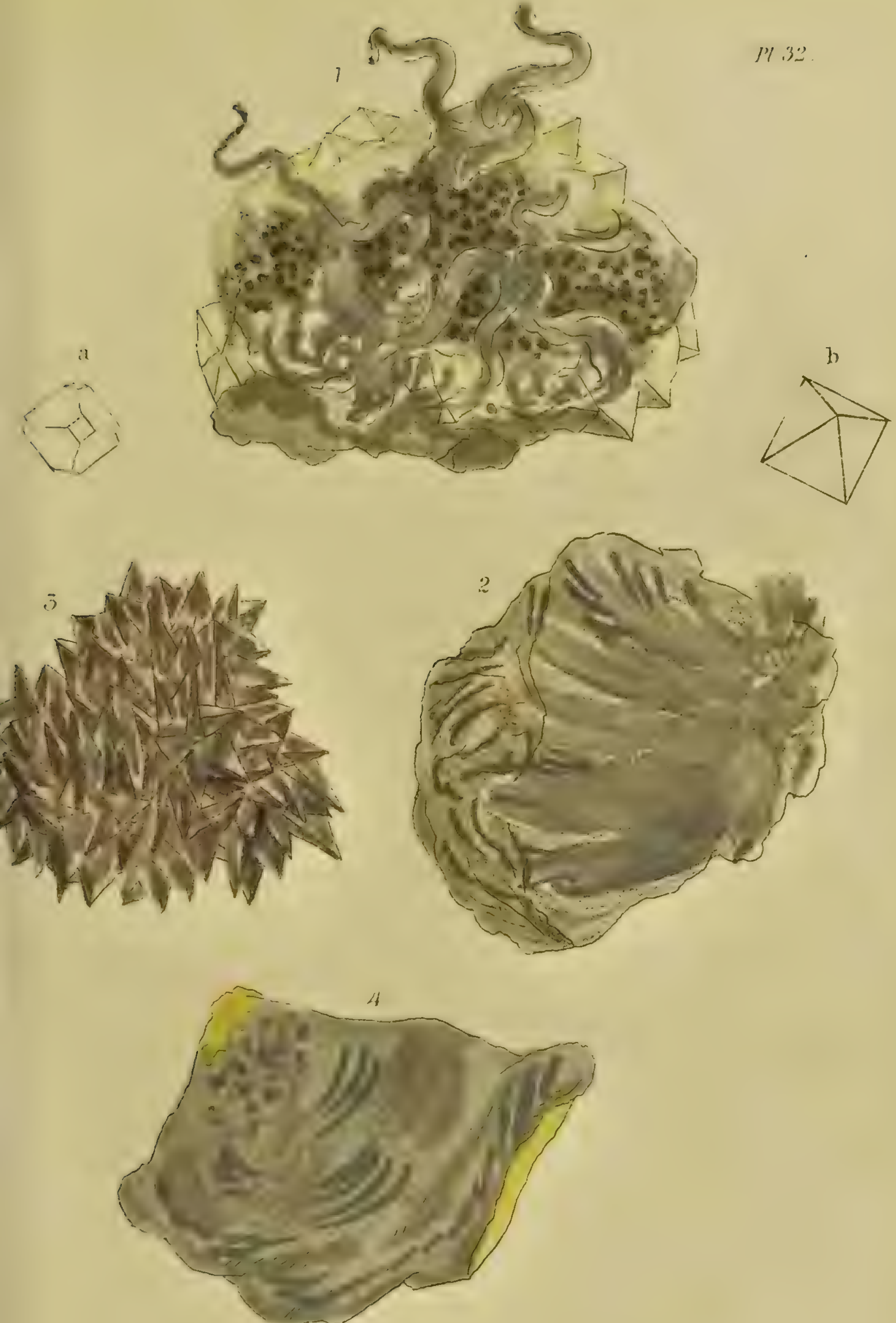
osmium. When pure, it is the heaviest of all known substances. Its colour is steel-grey, and its specific gravity from 16·0 to 20 0.

Spec. 1. Native Platina.—Pl. XXXI. fig. 5. Gediegen Platin, *Werner*; Platina aurum album, *Wallerius*, ii. p. 365 ; Platine natif, *Brong*. ii. p. 275 ; *Hauy*, iii. p. 365 ; *Jameson, Syst*. 2d ed. iii. p. 2. —Its colour is between steel-grey and silver-white. Externally it is shining or glistening, and the lustre is metallic. It is nearly as hard as iron, very malleable and ductile. Its specific gravity is 17·7. It is infusible by the common blow-pipe, and is soluble in the nitro-muriatic acid. It is never obtained pure, being always alloyed with small portions of other metals, more especially palladium and gold. Native platina occurs in irregular flatted grains, and in masses as large as a pigeon's egg. It was supposed till lately to be the exclusive product of South America, where it is met with in various places, particularly in Choco, one of the provinces of New Granada, in the province of Barbacoas, between the 2° and 6° of north latitude, and in the gold mines of Brazil. In these situations it occurs only in alluvial deposits, generally accompanied by grains and loose crystals of chrome ore, magnetic iron ore, copper pyrites, zircon, spinel, quartz, and native gold, with fragments of green-stone and sienite. M. Boussingault is said to have discovered native platina *in situ*, in decomposed sienitic rocks at Santa Rosa, about thirty miles north east from Medellin, in the province o Antioquia, in north latitude 6° 37′ 43″, situated 7462 feet above the level of the sea.* About the year 1820 it was discovered on the east side of the Oural mountains, between Nyné-Tajibskoi and Kuschtunskoi, in Siberia. According to Vauquelin, the *grey silver* ore of Guadalcanal, in Spain, contains from 1 to 10 per cent. of platina.† It is distinguished from *silver* by its colour, external shape, hardness, great specific gravity, its infusibility, and insolubility in nitric acid.

The process for obtaining Platina in a pure state was first pointed out by Dr. Wollaston. It consists in dissolving the grains of crude platina in nitro-muriatic acid, and adding a solution of mutiate of ammonia in excess; a yellow powder falls down, which

* *Ann. de Chim. et Phys.* xxxii. p. 204.

† *Id.* lx. 317.



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1.2.3 Native Silver. 4. Antimonial Silver.

London, Published by John Wilson. July 1831.

is a triple muriate of ammonia and platina. The precipitete is then exposed to a strong heat, which expels the acid and alkali, but leaves the platina in a pure state. Platina is thus obtained in the form of a spongy mass, which is rendered more compact by pressure while red hot. It is of a white colour, like silver; it is very malleable and ductile; its specific gravity is 21·5. It is not oxidized by exposure to air or moisture, and requires an intense heat for its fusion. Next to iron, it is the hardest of the metals, and like it admits of being welded. It is insoluble in all the acids, except the nitro-muriatic, which dissolves it with facility. It enters into combination with sulphur, phosphorus, and many of the metals. The salts of platina are formed by digesting its oxide in the acids with which it is to be combined. The most delicate test for the detection of platina is the muriate of tin, which gives a bright red colour to any of its solutions.

Uses.—Metallic Platina, like gold, has no action on the human body; but it is stated by the French physicians that the medicinal and poisonous properties of the salts of this metal are nearly allied to those of the salts of gold, From its extreme hardness and infusibility, platina is employed in making chemical apparatus, particular crucibles, where these require to be exposed to intense heat, or to the action of corrosive liquids; and for coating steel, copper, and various metallic substances, to protect them from the atmosphere. It is also used in the construction of Professor Daniell's pyrometer, the best instrument which has hitherto been invented for measuring high temperatures, Davy's safety lamp, Clarke's night light without flame, the wheels of watches, telescope mirrors, and for a variety of other useful purposes.

Genus III.—SILVER.

Argent, Fr.; *Argento*, It.; *Plata*, Sp.; *Silber*, Ger.; *Rupah*, Hind.

The ores of Silver are numerous; it is sometimes found native, but more frequently mineralized with oxygen, sulphur, and with the carbonic and muriatic acids. It occurs also combined with the

ores of other metals, particularly with antimony, arsenic, bismuth, and lead; but occasionally the proportion of silver is insufficient to repay the expence of extracting it. Silver ores occur principally in veins in primary and transition rocks, associated with various earthy and metallic minerals. It has been remarked that the warmer regions of the globe afford the greatest quantity of gold, but the richest repositories of silver are situated either in the higher latitudes, or in elevated regions. The most celebrated silver mines of Europe are in Sweden and Norway, at no great distance from the polar regions, and those which are in warmer latitudes are almost all situated near the summits of alpine mountains, as at Allemant, in France, and the mines of Mexico and Peru. Before the blow-pipe, nearly all the ores of silver yield a globule of metallic silver. "They dissolve in nitric acid, and the silver is precipitated by the muriatic acid, forming a white insoluble matter, that is reducible to a globule of metallic silver, which is not altered by a continuance of the heat. The solution of silver in nitric acid, tinges animal substances black, and deposits a coat of silver or copper when immersed in it. These properties characterise the ores of silver when they contain any notable portion of that metal."

Sp. 1. Native Silver. Pl. XXXII. fig. 1, 2, 3.—Gediegen Silber, *Werner*; Hexaedrisches Silber, *Mohs.*; Argent natif, *Hauy*, iii. p. 384; *Brong.* ii. p. 248; Native Silver, *Jameson, Syst.* p. 42; *Sowerby Brit. Min.* iv. p. 327.—Its colour is silver-white; by exposure to the air it becomes yellowish, or greyish black. It occurs massive and crystalized in cubes, octahedrons, either regular or truncated on the angles (Pl. 32, figs. *b* and *a*), four or six-sided prisms; also in tables and six-sided pyramids. It is frequently found in thin membranes, capillary or reticulated, also dendritical and in leaves. Native silver is softer than iron or copper, flexible, and malleable. Its specific gravity is about 10. It is generally alloyed with a small portion of antimony, gold, copper, or arsenic. It occurs sparingly in veins, traversing clay-slate in several of the mines in Devonshire and Cornwall; in lime-stone, sand-stone, and clay porphyry, in Stirlingshire, and other districts in Scotland; in granite, in the Saxon Erzgebirge; in gneiss and mica slate at Konigsberg, in Norway, Saxony, and Bohemia. It is

found in the greatest abundance in the mines of South America. Native gold is distinguished from *antimonial silver* and *native antimony*, by its hackly fracture, tenacity, and malleability,

Sp. 2. Antimonial Silver. Pl. XXXII. fig. 4.—Spieglas Silber, *Werner*; Argent Antimonial, *Hauy*. iii. p. 391; *Brong*. ii. 249; Antimonial Silver, *Jameson*, iii. p. 53.—Its colour is intermediate between silver-white and tin-white; the lustre is shining, but frequently tarnished reddish or yellow externally; internally shining and splendent, with a metallic lusture. It generally occurs massive, or in grains; sometimes disseminated, globular, tuberose, and crystalized. The most frequent crystalizations of this mineral are the cube, the double six-sided pyramid, and the four-sided or six-sided prism. The structure is laminar; it is soft, sectile in a slight degree, but is easily frangible. The specific gravity varies from 9·40 to 10·00. According to Klaproth, the constituents of the ore from Altwolfach are, silver 84, antimony 14; that from Andreasberg, silver, 75½, antimony 24½. Antimonial silver ore occurs in veins traversing granite, greywacke and clay slate at Konigsberg, in Norway; also in Spain, Germany, and France. It is distinguished from *native silver* and *white cobalt ore* by its sectility and foliated fracture, from *arsenical* pyrites by its foliated fracture and inferior hardnes,

Sp. 3. Arsenical Silver Ore.—Arsenik Silber, *Werner*; Argent Antimonial Arsenifere, et ferrifere, *Hauy*, iii. p. 112; Argent Arsenical, *Brong*. ii. p. 250; Arsenical Silver, *Jameson*, iii. p. 76. Its colour on the fresh surface is tin-white, but tarnishes greyish-black.—It is found massive, disseminated, globular, reniform, and crystalized, in rectangular four-sided prisms. Its fracture is imperfect foliated. It is harder than antimonial silver, but is sectile, easily frangible, and the specific gravity is about 9·44. The antimony and arsenic are volatalized before the blow-pipe, with a garlic smell, and a globule of silver more or less pure remains. Its constituents are, arsenic 35, iron 44·25, silver 12·75, antimony 4. It occurs in veins in primitive and transition rocks, in Germany and Spain.

Sp. 4.—Sulphuretted Silver, Vitreous Silver, or Silver Glance. Pl. XXXIII. fig. 1.—Glaserz, *Werner*; Argent

sulfure, *Hauy*, iii. p. 398-402; *Brong*. ii. p. 251; Compact Silver-glance, *Jameson*, iii. p. 68.—This is one of the most frequent of ores of silver. It is of a dark lead grey colour, often with an irridescent tarnish. It is found crystalized, and in amorphous masses; also disseminated, in plates, dentiform, capillary, reticulated, dendritical, stalactitic, and in leaves. The crystals are cubes, octahedrons, rhomboidal dodecahedrons, double eight-sided pyramids, or three and six-sided tables. The fracture is fine grained and uneven, with a more or less shining lustre. It is soft, very malleable, and flexible, but not elastic. Its specific gravity is from 5·7 to 6·1. Before the blow-pipe the sulphur is volatalized, and a globule of pure silver remains. According to Klaproth its constituents are, silver 85, sulphur 15. Sulphuretted silver occurs in veins traversing primitive and transition rocks, in the Hartz, Saxony, Bohemia, and other mining districts on the continent. It is also met with in small quantities in Cornwall and America. It is very common in the mines of Mexico and Peru.

Sp. 5. Brittle Silver Glance.—Spröd Glaserz; *Werner*. Argent antimonié sulfure noir, *Hauy*. Rhomboidal Silver Glance, *Jameson*.—The colour of this species of dark-lead grey, passing into iron-black. It occurs massive, disseminated in thin plates, and also crystalized. The primitive form is a rhomboid; the secondary figures, an equiangular six-sided prism, an equiangular six-sided table, and a double six-sided pyramid. It is soft and brittle. The fracture is somewhat conchoidal or uneven; and the lustre splendent and metallic. The specific gravity is 5·7 to 6·1. Before the blow-pipe it melts, the sulphur, antimony, and arsenic are driven off, and there remains a globule of silver, surrounded by a slag. According to Klaproth, it contains, silver 66, sulphur 12, antimony 10, iron 5, copper and arsenic 0.50, earthly matter 1. It occurs in veins, principally in gneiss and clay-slate, in various mines of Hungary, Saxony, Bohemia, Siberia, Mexico, and Peru.

Sp. 6. Red or Ruby Silver. Pl. XXIII. fig. 2.—Spröd Glaserz, *Werner*; Argent antimonié sulfure, *Hauy*; Argent rouge, *Brong*. i. p. 254; Red Silver Ore, *Jameson*, iii. p. 78.—It is divided by Werner into two sub-species, or varieties, dark red silver ore, and

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1. Sulphuretted Silver.

2. Red, or Ruby Silver.

3. Native Bismuth.

4. Sulphuretted Bismuth.

London, Published by John Wilson, July 1831.

light-red silver ore, and is characterized by the red colour which all the varieties yield when powdered. The prevailing colour is cochineal red, passing into lead-grey and iron-black. It occurs crystalized in a great variety of forms, also disseminated, amorphous, in grains, or botryoidal, dendritical, reniform, cellular, and in leaves. According to Hauy, the primitive form is an obtuse rhomboid (fig. *b.*) The number of secondary forms known to mineralogists are 14. The most common are an equiangular, six-sided prism, or a six-sided prism terminated by three rhomboidal faces, (fig. *c.*) In dark red silver ore the streak is cochineal red; in the light red variety the streak is aurora red. The structure is laminar. The fracture is uneven or imperfectly conchoidal with a shining lustre. It yields easily to the knife, and is very brittle. The specific gravity is about 5·6. It decrepitates before the blow-pipe, and melts with a slight effervescence, emitting a white vapour, and leaving behind a globule of metallic silver. It consists according to Thenard, of 58·4 oxide of silver, 23·5 oxide of antimony, 16 of sulphur. With respect to its *distinctive characters*, Mr. Bakewell observes, " Cinnabar ,realgar, red antimony, red copper ore, black sulphuret of copper, and sulphuret of silver, have some resemblance to red silver, but may be distinguished by the following characters :—*Cinnabar, realgar,* and *red antimony,* are entirely volatalized by the blow-pipe if pure; their specific gravity varies considerably from that of red silver; *red* or *ruby* copper effervesces in nitric acid, and the solution communicates a blue colour to ammonia; *black sulphuret of copper* or vitreous copper yields a blackish streak. *Sulphuret of silver* has a greater specific gravity, and does not yield a red streak. *Red silver ore* accompanies other ores of silver in veins traversing gneiss, mica slate, porphyry, and greywacke, in many of the mining districts, as Cornwall, Hartz, Saxony, Hungary, Mexico, and Peru.

Sp. 7. White Silver Ore.—Weissgultigerz, *Werner*; Plomb sulfuré antimoniferé et argentiferé. *Hauy*; Argent blanc, *Brong.* —The prevailing colour is pale lead-grey. It occurs massive and disseminated, and always associated with lead glance. The fracture is even and fine grained, sometimes fibrous. It is soft and somewhat brittle. The specific gravity is 5·3. An analysis of

Klaproth gives, lead 41, silver 9·25, antimony 21·5, iron 1·75, sulphur 22, alumina 1, silica 0·75. It is found near Freyberg, in Saxony.

Sp. 8. Grey Silver Ore.—Argent carbonaté, *Hauy.*—Its colour is ash-grey; it occurs massive and disseminated. The fracture is fine-grained, uneven, with a glistening metallic lustre. It is soft, sectile, and somewhat brittle. Its constituent parts are, silver 72·5, carbonic acid 12, oxide of antimony and a trace of copper 15·5. It is found in a vein at Altwolfatch, in the Black Forest.

Sp. 9. Horn Silver.—Hornerz, *Werner*; Argent muriate, *Hauy*, iii. p. 418-422; *Brong.* ii. p. 256; Corneous Silver Ore, *Jameson*, iii. p. 60.—Its colours are pearl-grey, greenish-grey, also blue and leek-green. It occurs massive and crystalized, in small cubes, octahedrons and rhomboidal dodecahedrons. It is more or less translucent, with a glistening or waxy lustre. It is very soft, and yields to the pressure of the nail. Its specific gravity is about 4·8. It is fusible in the flame of a candle; before the blow-pipe on charcoal it yields a metallic globule, giving out at the same time vapours of muriatic acid. A specimen from Peru yielded, silver 76, muriatic acid 16·4, oxygen 7·6. It is found sparingly at Huel-Mexico, in Cornwall; but is very abundant in some of the silver mines of Potosi, in South America.

Sp. 10. Bismuthic Silver.—Wismuth Silbererz, *Werner*; Bismuthic Silver Ore, *Jameson*, iii. p. 58.—Its colour is pale lead-grey. It occurs disseminated; and rarely crystalized in acicular and capillary crystals. Its lustre is glistening and metallic. Its fracture is fine-grained, uneven. It is soft, sectile, and somewhat brittle. It consists, according to Klaproth, bismuth 27, lead 33, silver 15, iron 4, copper 0·90, sulphur 16·30. This ore has been found only in one mine, in the Schapbach, in the Black Forest, where it occurs in veins that traverse gneiss, along with copper pyrites, quartz, iron pyrites, and galena, or lead glance.

"Silver is extracted from its ores by two processes which are essentially distinct; one of them being contrived to separate it from lead, the other, the process by *amalgamation*, being especially adapted to those ores which are free from lead. The principle of

its separation from lead is founded on the different oxidability of lead and silver, and on the ready fusibility of litharge. The lead obtained from those kinds of galena which are rich in sulphuret of silver, is kept at a red heat in a flat furnace, with a draught of air constantly playing on its surface; the lead is thus rapidly oxidated; and as the oxide, at the moment of its formation, is fused, and runs off through an aperture in the side of the furnace, the production of litharge goes on uninterruptedly till all the lead is removed. The button of silver is again fused in a smaller furnace, resting on a porous earthen dish, made with lixiviated wood-ashes, called a *test*, the porosity of which is so great, that it absorbs any remaining portions of litharge, which may be formed on the silver."

"The ores commonly employed in the process of amalgamation, which has been long used at Freyberg, in Saxony, and is extensively practised in the silver and gold mines of South America, are native silver and its sulphuret. The ore in fine powder is mixed with sea salt, and carefully roasted in a reverberating furnace. The production of sulphuric acid leads to the formation of sulphate of soda, while the chlorine of the sea salt combines with silver. The roasted mass is ground to a fine powder, and, together with mercury, water, and fragments of iron, is put into barrels, which are made to revolve by machinery. In this operation, intended to insure perfect contact between the materials, chloride of silver is decomposed by the iron, the silver unites with the mercury, and the chloride of lime is dissolved by the water. The mercury is then squeezed through leathern bags, through the pores of which the pure mercury passes, while the amalgam of silver is retained. The combined mercury is then distilled in close vessels, and the metal obtained in a separate state.*"

Silver may be obtained free from copper, for chemical and pharmaceutical purposes, by dissolving it in nitric acid, diluted with its weight of water; then adding a solution of muriate of soda, and exposing the precipitate to heat, with three parts of the carbonate of potash. Pure silver has considerable lustre, and a brighter

* Turner's *Elements of Chemistry*, p. 560.

white colour than any of the metals. It is insipid, inodorous, and not oxidated by air or moisture, but soon becomes tarnished from the presence of sulphuretted hydrogen. It is much harder than gold, of considerable malleability, and may be extended into leaves not exceeding the ten thousandth part of an inch in thickness. It melts at a high temperature, assuming a crystaline appearance as it cools, and is volatalized by a very intense heat. It combines with iodine, sulphur, phosphorus, and many of the metals. Silver is oxidized by several of the acids, and the *oxide* may be easily obtained, by adding lime-water to the solution of nitrate of silver, and washing the precipitate.

Salts of Silver.

The salts of silver may be formed either by the direct action of the acids on the metal, or by digesting the oxide of silver in the acid with which they are to be combined. None of the salts of this metal, however, except that formed with the nitric acid, are employed in medicine.

Nitrate of Silver.—The London College directs this salt to be prepared by pouring *one ounce* of nitric acid, diluted with *two ounces* of distilled water, on *an ounce* of metallic silver. A violent effervescence takes takes place, and the solution proceeds rapidly, especially if it be assisted by a moderate heat, acquiring at the same time a temporary green colour. In this process the silver decomposes a portion of the nitric acid, attracting oxygen from it, attended at the same time with the evolution of a large quantity of nitrous oxide gas; the oxide so formed combining with another portion of acid, and remaining in solution. The solution should be perfectly clear and colourless; if the silver, however, be contaminated with any copper, it will have a permanent greenish tint; the nitric acid must also be very pure, for if it contains any sulphuric or muriatic acids, the solution will be turbid and will deposit a white powder. The metal is generally flatted into thin plates, which are cut in pieces to facilitate the action of the acid; and when the solution is completed, it is evaporated to dryness. The dry mass is then exposed to a gentle heat in a porcelain crucible, which is gradually increased till it is fused and flows like

oil, when it is poured into iron tubes previously heated and greased, to prevent the nitrate from adhering to its sides. When fused, and cast into small cylinders, it is called the *lunar caustic,* or the *argenti nitras* of the pharmacopœias. In this state it is of a blackish colour externally, and when broken, it presents internally a radiated appearance. It is inodorous, has an intensely bitter metallic taste, and tinges animal substances of a yellow colour, which, by exposure to light, becomes purple, and ultimately black. It is soluble in about its own weight of water at 60°, and is also soluble in alcohol. It is decomposed by heat, by many of the acids, by the alkalies, and many neutral salts, and by astringent solutions. Some of the metals, also, particularly copper and mercury, precipitate the silver from its aqueous solution, in a metallic state. In the form of crystals, it consists of 64 parts of oxide of silver, 22 of nitric acid, and 14 of water.

The Nitrate of Silver was introduced as an internal remedy by Angelus Sala, in the commencement of the seventeenth century. Boerhaave highly extols it as a diuretic in dropsies;* in modern practice it has been prescribed as a tonic and antispasmodic in epilepsy, chorea, and angina pectoris. It is given in the dose of $\frac{1}{8}$ of a grain, gradually increased to 4 grains or more, three times a-day, in the form of a pill. A singular blueness of the skin is sometimes observed after the protracted use of the nitrate of silver, the whole surface of the body, especially those parts that are most exposed to light, acquire a leaden-grey or livid hue, which often continues for a long time after its disuse. When taken in an over-dose, it acts as a corrosive poison; the antidote for which is the muriate of soda. Externally the nitrate of silver has been much used as an escharotic, to change the surface of foul ulcers, and to destroy strictures in the urethra, warts, fungous excrescences, and incipient chancres. Its solution, in the proportion of from one to five grains to the ounce of distilled water, is sometimes used as an injection in fistulous sores, and as a stimulating application to indolent ulcers, to apthous affections of the mouth, and to that disease of the gums generally denominated scurvy. One scruple

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* See Boerhaave's *Chemistry*. pt. ii. p. 297.

of the nitrate of silver, dissolved in ℥ss of distilled water, is recommended by Mr. Samuel Cooper, as one of the best external applications to *noli me tangere,* and to cancerous ulcers about the nose and neighbouring parts of the face. The lotion is sometimes applied by a pencil to the part, but more commonly by dipping pieces of lint in the fluid and covering them with a pledget.

A solution of the nitrate of silver stains animal or vegetable substances of a deep black colour, hence it is frequently used for marking linen in a permanent manner. For this purpose the cloth is moistened with a liquid made by dissolving two ounces of subcarbonate of soda and two drachms of gum arabic in four ounces of water, and the solution of the salt itself thickened with a little gum, and coloured with Indian ink. A solution of this salt is also resorted to for the manufacture of those compounds employed to change the colour of the hair. When applied recently to grey hair, after exposure to light, it renders it black; but the colour soon changes, the grey roots of the hair again appear, giving the person the singular appearance of having hair half grey and half black. According to Mr. Brande, the hair sometimes becomes purple; at other times there are patches of purple and grey, giving such victims of vanity a very ludicrous appearance. The preparations for changing the colour of the hair are sold under the names of Grecian Water, Essence of Tyre, and other high-sounding titles.

Genus IV.—BISMUTH.

Bismuth, Fr.; *Wismuth*, Ger.

Bismuth is a metal of no very considerable importance in medicine and the arts. It appears to have been unknown to the ancients, and even so late as the seventeenth century was considered as a species of lead. It exists somewhat sparingly in nature, and is found native and combined with sulphur and with oxygen.

Sp. 1. Native Bismuth. Pl. XXXIII. *fig.* 3.—Gediegen Wismuth, *Werner*; Bismuth natif, *Hauy; Brong*, ii. p. 131.

Octahedrisches Wismuth, *Mohs.*—Its colour is silver-white, occasionally tinged with red; the lustre is metallic and splendent. It is seldom massive generally disseminated, in plates having plumosely-streaked surfaces, reticulated, and crystalized. The crystals are regular octahedrons, which is the primitive form, acute rhomboids, (fig. *a*,) cubes, and tetrahedrons. Its specific gravity is 9·02. Its fracture is foliated, with a cleveage in three directions: it is soft, sectile, and somewhat malleable. It is very fusible, and melts even in the flame of a candle. Before the blow-pipe it is volatilized, in the form of white vapours, which have an arsenical odour. It dissolves with effervescence in nitric acid, and the solution is decomposed when water is added, and a white precipitate is formed. This precipitation of the nitric solution by the addition of water, is the distinctive character by which bismuth is distinguished from most other metals. It occurs in veins in primitive rocks in Cornwall, and other mining districts in Europe and North America, but its chief localities are at Joangeorgenstadt and Schneeberg in Saxony, from whence the supply of Bismuth in commerce is principally obtained. To procure the metal, the ore merely requires to be reduced to small fragments and exposed to a moderate heat in a furnace, with a quantity of reducing flux, when the bismuth separates from the earthy matter in which it is disseminated, and flows out into cast iron moulds prepared for its reception.

Sp. 2. Sulphuretted Bismuth, or Bismuth Glance.—Wismuth Glanz, *Werner*; Prismatischer Wismuth Glanz, *Mohs.*; Bismuth sulfuré, *Haüy.*—Its colour is pale lead-grey. It occurs amorphous, in granular and radiated concretions, and crystalized in oblique four-sided prisms. The fracture is foliated, and it is divisible into slightly rhomboidal prisms. The lustre is splendent and metallic. It is sectile, brittle, easily frangible, soft, and soils the fingers. The specific gravity is from 6·1 to 6·4. It melts in the flame of a candle. Its constituents are bismuth 60, sulphur 40. It is rather a rare mineral; and chiefly occurs in veins traversing primitive rocks in various parts of Cornwall; in granite at Carrock-fell in Cumberland, and other countries.

Acicular Bismuth, Plumbo-cupreous Bismuth or Needle-ore.

—Its colour is dark lead-grey, with a shining metallic lustre. It occurs disseminated, and crystalized in oblique four or six-sided acicular prisms. It is opaque, brittle, and yields easily to the knife. The specific gravity is 6·2. It fuses before the blow-pipe into a steel-grey globule. Its constituents are bismuth 43·2, lead 24·3, copper 12·1, sulphur 11·3, nickel 1·5, tellurium 1·3, gold 07·9. This variety occurs near Beresof, in Siberia, imbedded in rhomboidal quartz, which in the specimen here represented (Pl. XXXIII. fig. 4,) is tinged with carbonate of copper.

Cupreous Bismuth.—Its colour is pale lead-grey, with a yellowish or reddish tarnish. It occurs massive and in small acicular scopiformly aggregated crystals. The lustre is shining and metallic. It is soft, and yields easily to the knife. It contains, bismuth 47, copper 47, sulphur 60. It has hitherto been found only in the principality of Furstenberg, and is extremely rare.

Sp. 3. Bismuth Ochre.—Wismuthoker, *Werner*; Bismuth oxydé, *Hauy*.—Its colour is straw-yellow. Its structure is laminar, fin-grained, or earthy, with a glimmering lustre. It is opaque, very soft, and sometimes friable. Its specific gravity is 4·37. It dissolves with effervescence in acids. It is easily reduced before the blow-pipe, on charcoal. Its constituents are, oxide of bismuth 86·3, oxide of iron 5·2, carbonic acid 4·1, water 3·4. It is found at St. Agnes, in Cornwall.

Bismuth, when pure, has a reddish-white colour, and its texture is foliated. Its specific gravity is 9·8. It is very brittle, breaks under the hammer, and cannot be drawn into wire. It is very fusible, and melts at a temperature of 476° Fahrenheit; by a strong heat it is volatilized. If it be exposed to the air while in fusion, it attracts oxygen; a greenish-grey powder being formed on its surface. Bismuth takes fire and burns with a blue flame at a higher temperature, and a yellow oxide is obtained, known by the name of *flowers of bismuth*. When bismuth, in a state of fine division, is exposed to chlorine gas, it takes fire, burns with a pale blue light, and is converted into a chloride. Nitric acid acts powerfully on bismuth, oxidating and dissolving it, while nitric oxide is disengaged, and a considerable heat produced. Sulphuric and muriatic acids, have comparatively little action on bismuth. Bis-

muth also combines with iodine and sulphur, but not with carbon, hydrogen, or phosphorus. Bismuth is capable of being alloyed with most metals, and forms with some of them compounds of remarkable fusibility. Bismuth enters as an ingredient into the composition of printing-types, and of pewter; it is used as solder in the construction of mirrors, and for the refining of gold and silver. The old pharmaceutical writers describe Bismuth under the names of *tin-glass* and *marcasite*; but the metal itself is not used medicinally.

Salts of Bismuth.

The only preparation of this metal employed as an article of the materia medica is the subnitrate.

Subnitrate of Bismuth, *Bismuthi Subnitras.* Ph.—If the nitric solution, or the crystals which it deposits, be acted on by a large portion of water they are decomposed, and the subnitrate is thrown down in the form of a fine white powder. When washed and dried it is inodorous and insipid. It was known formerly under the name of *blanc de fard*, and *blanc de perle* or pearl powder, and *magistery of bismuth*, and is used as a paint for the complexion; but like the oxides of lead, is liable to become black on exposure to the sulphuretted hydrogen gas. Medicinally, the sub-nitrate of bismuth has been employed as a tonic and antispasmodic, with considerable advantage, in pyrosis, gastrodynia, and other affections, attended by loss of tone and increased irritability of the stomach.* The best form for its use is that of a pill, with any bitter extract. The dose may be from gr. ii. to gr. xii. twice or thrice a-day. From the experiments of Orfila on brute animals it would appear that in large doses this salt proves an active poison. Dr. Kerner, of Weisenberg, in "Heidelbergen Klinische Annalen," relates the case of a man who took, by mistake for magnesia, a large quantity of the subnitrate of bismuth: soon afterwards he felt a burning sensation in the throat, and was affected with singultus, frequent vomiting of a brownish

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† See Odier, *Manuel de Medecine Pratique*, 1805. Carminati, *Opuscula Therapeutica.* Marcet, *Mem. Lond. Med. Soc.* Bardsley's *Med. Reports*, 1807. Yeats, *Quarterly Journal*, vol. viii. p. 295.

matter, and diarrhœa; the pulse was small and intermittent; the face pale, and the whole body cold and clammy; the voluntary muscles, especially those of the lower extremities, were spasmodically contracted; the throat and pharynx were inflamed; deglutition was lost, and he complained of much pain in the throat, a nauseous metallic taste, and intolerable thirst. The respiration became laborious, the abdomen became swelled and tender, there was constant retching and hiccup, complete suppression of urine supervened, the symptoms of enteritis increased, and he died on the evening of the ninth day after the accident. On examination, almost the whole of the abdominal canal from the throat down to the extremity of the rectum was found inflamed and in many places gangrenous. The lower portion of the spinal chord, and the internal membrane of the heart, also exhibited traces of inflammation. Orfila remarked that two drachms, when mixed with water and introduced into the stomach of a dog, caused death in twenty-four hours.

Genus V.—COPPER.

Cuyvre, Fr.; *Rame*, It.; *Cobre*, Sp.; *Kupfer*, Ger.; *Tamba*, Hind.

Copper, like tin, has been long known; it is extensively used in the arts, and many of its compounds for medicinal purposes. It occurs native, in combination with several of the metals, and with sulphur, oxygen, and various acids; hence its ores are numerous. It is found in most parts of the globe, but the richest copper-mines are situated in Cornwall. Nearly all the copper of commerce is obtained from copper pyrites and grey copper ore.

Sp. 1. Native Copper. Pl. XXXIV. fig. 1, 2.—Gediegen Kupfer, *Werner*; Cuivre Natif, *Hauy*.—It has the lustre and the yellowish red colour of metallic copper; it is frequently tarnished or incrusted with green or black. It occurs crystalized in the form of the cube and octahedron, the dodecahedron, and the

Drawn by Joffrey

1.2 Native Copper. 3. Black Sulphuret of Copper.

4. Yellow Sulphuret or Copper Pyrites.

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rectangular four-sided prism. The crystals are generally aggregated in groups, and variously modified by truncation and bevelment. Thus fig. *a*, represents a cube truncated on the angles; fig. *b*, an octahedron truncated on the lateral edges, forming the passage of that solid into the rhomboidal dodecahedron, fig. *c*. It occurs also capillary, dendritic, botryoidal, in thin plates, disseminated, and in amorphous masses. It is softer than native silver, sectile, perfectly malleable, and flexible, but not elastic. It is very tough and its fracture is hackly. Its specific gravity varies from 7·7 to 8·5. Before the blow-pipe, it melts into a bead of apparently pure copper. It may be distinguished from *copper nickel* by its malleability and inferior hardness; from *native gold* by its inferior specific gravity and its solubility in nitric acid. Native copper occurs in veins, and imbedded in various primitive, transition, and secondary rocks. It is occasionally accompanied by several of the ores of copper, and sometimes those of other metals. It also occurs in large blocks in alluvial soil, in various parts of the globe. One of the largest masses hitherto noticed was discovered by Schoolcraft, the North American traveller, about thirty miles from Lake Superior, on the western bank of the river Ontonagon. It weighs by estimation 2200 pounds. Native copper is frequently found in connexion with the secondary green-stone, and red sand-stone formation in the United States. It is likewise found in several different mining districts in Germany and in Norway; but its greatest known depositaries in England are the mines of Cornwall.

Sp. 2. Black Sulphuret of Copper, Vitreous Copper, or Copper Glance. Pl. XXXIV. fig. 3.—Kupferglanz, *Werner*; Cuivre sulfuré, *Hauy.*; Cuivre vitrieux, *Brongniart.*—Its colour is blackish lead-grey. It occurs massive, disseminated, and crystalized in six-sided prisms, (fig. *b*,) and six-sided pyramids. According to Hauy, the primitive form is a six-sided prism. One of the varieties of this figure, a flattish dodecahedron is represented at fig. *e*; fig. *f*, a six-sided prism truncated on the terminal edges; fig. *a*, an acute dodecahedron with triangular planes. The structure in some varieties is distinct laminar. The fracture is imperfectly conchoidal, with a glistening or vitreous metallic lustre. This ore varies considerably in density, hardness, and colour. It

sometimes yields easily to the knife; and its specific gravity varies from 4·8 to 5·4. Before the blow-pipe it melts into a grey globule containing iron, and is frequently magnetic. A specimen analysed by Chenevix, contained copper 81, sulphur 12, iron 4. This ore is found abundantly in Cornwall; also at Middleton, in Yorkshire, and other mining districts.

Sp. 3. Yellow Sulphuret of Copper, or Copper Pyrites. Pl. XXXIV. fig. 4.—Kupferkies, *Werner;* Octaedrischer Kupferkies, *Mohs.* Cuivre pyriteux, *Brong.*—Its colour is brass-yellow, but is often externally tarnished. It occurs massive, disseminated, in various particular forms, and crystalized, in tetrahedrons, which are frequently truncated on the angles or edges, more rarely in cubes, octahedrons, and rhomboidal dodecahedrons. Internally it is shining, with a metallic lustre. The fracture is commonly uneven, sometimes conchoidal. The structure of the crystals is laminar, of the mamillated and botryoidal varieties, fig. *a* 4, granular. The specific gravity varies from 4·1 to 4·2. It is harder than calcareous spar, brittle, and yields to the knife. Before the blow-pipe it decrepitates, emits a green-coloured sulphureous vapour, and melts into a black globule. Its composition varies considerably; a specimen analysed by Chenevix yielded, copper 30, iron 53, sulphur 12·1. Copper pyrites is one of the most abundant metalliferous minerals; and, according to professor Jameson, occurs in almost every kind of repository, in all the great classes of rocks. "It may be distinguished," says this celebrated mineralogist, "from *native gold* by its fracture and also by its tenacity, it being brittle, whereas gold is malleable. It is distinguished from *iron pyrites* by its hardness, it being rather soft, whereas iron pyrites give sparks with steel; also by its colour, and the form of its crystals."

Sp. 4. Purple Copper. Pl. XXXV. fig. 1.—Buntkupfererz, *Werner*; Cuivre pyriteux hepatique, *Hauy*; Variegated Copper Ore, *Jameson.*—This ore is merely a variety of copper pyrites. Its colour is intermediate between copper-red and pinchbeck brown, with an iridescent tarnish of violet-blue or yellow. It occurs massive, and crystalized in cubes, fig. *a*, frequently truncated on the angles, fig. *b*, and also in tables. Its constituents are

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urple Copper. 2, Gray Sulphuret of Copper.

3. Red Copper, or Ruby Copper.

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copper 69·5, sulphur 19, iron 7·5, oxygen 4. It is found with several of the other ores of copper, in Cornwall, Norway, Saxony, and other countries.

Sp. 5. Grey Sulphuret of Copper. Pl. XXXV. fig. 2.—Fahlerz, *Werner*; Cuivre gris, *Hauy*.—Its colours are steel-grey, lead-grey, or iron-black. It occurs massive, disseminated, and crystalized, in small tetrahedrons, variously truncated, fig. *c*, *d*, *e*; also in rhomboidal dodecahedrons. It is brittle; the fracture is uneven or imperfectly conchoidal, with a shining or metallic lustre. It yields to the knife. The specific gravity is 4·5. Before the blow-pipe it gives out arsenical vapours, decrepitates, and melts into a brittle grey globule. It varies greatly in its chemical composition, one variety, according to Chenevix, yields copper 52, iron 33, sulphur 14. It is found in Cornwall, and various other countries.

Sp. 6. Red Copper or Ruby Copper. Pl. XXXV. fig. 3.—Rothkupfererz, *Werner*; Cuivre oxide rouge, *Hauy*; Octaedrisches Kupfer erz, *Mohs*.—The colour of this mineral is dark cochineal red of various shades, passing into lead-grey or brown. It occurs massive and crystalized in the form of the octahedron, which is the primitive form; also in cubes and rhomboidal dodecahedrons. The crystals are small and transparent or translucent, externally splendent, sometimes iridescent or superficially tarnished, with a metallic lustre. The structure of the crystals is laminar; the cross fracture is uneven, sometimes conchoidal. It yields easily to the knife, and gives a brownish streak. The specific gravity is from 5·6 to 6·0. It dissolves with effervescence in nitric acid. Before the blow-pipe on charcoal it is easily reducible to the metallic state. It consists of copper 88·5, oxygen 11·5. *Chenevix*. This species is found in veins in primitive, transition, and secondary rocks, associated with other ores of copper, in Cornwall, Germany, Siberia, Norway, and other countries.

Compact Red Copper Ore is of a dark red colour, with a semi-metallic lustre. It occurs in amorphous masses, disseminated, and also reniform. It is opaque or translucent on the edges; and the fracture is even or granular.

Capillary Red Copper Ore, consists of very minute capillary

crystals, or thin tables of a carmine red colour, which are sometimes aggregated into amorphous or scopiform flakes. The crystals are translucent with an adamantine lustre.

Ferruginous Red Copper, or Tile Ore, is of a reddish-brown colour, lead-grey or blackish. It occurs massive, disseminated, and incrusting copper pyrites. The lustre is dull or glimmering. The fracture is earthy or imperfect flat conchoidal; it yields easily to the knife, and sometimes to the nail.

Sp. 7. Blue Carbonate of Copper. Pl. XXXVI. fig. 1.—Kupferlazur, *Werner*; Cuivre carbonaté bleu, *Hauy*.—Oxide of copper combined with carbonic acid forms two species, the blue and the green carbonate. Of the blue carbonate of copper there are two varieties:—the *radiated* has an asure blue colour, which often passes into blackish-blue, Berlin-blue, and smalt-blue. It occurs massive, imitative, in prismatic distinct concretions, and very frequently crystalized. The crystals are minute, and generally in the form of oblique four-sided prisms. Externally the lustre is shining, in the massive and particular external shapes dull; internally between vitreous and resinous. The crystals are semi-transparent or translucent. The fracture is small and imperfect conchoidal. This ore is brittle and rather easily frangible. The specific gravity varies from 3·2 to 3·6. It dissolves with effervescence before the blowpipe. Its constituents are, copper 56, oxygen 14, water 6. This mineral occurs in veins with other ores of copper, in Cornwall, in Scotland, and in many places on the continent.

Earthy Blue Carbonate of Copper has a smalt-blue colour, and occurs in friable incrustations or masses, composed of dull earthy particles.

Sp. 8. Green Carbonate of Copper, or Malachite.—Fasrichter Malachat, *Werner*; Cuivre carbonaté vert, *Hauy*.—This ore of copper is divided into two sub-species, viz. fibrous malachite and compact malachite. *Fibrous malachite*, has an emerald-green colour. It is seldom massive, sometimes disseminated, tuberose, stalactitic, reniform, botryoidal, and in fibrous distinct concretions; but it is most commonly found forming an incrustation on the surfaces of other ores. The fibres are slender scopiform, or stellular, and the lustre is generally silky. It occurs also crystalized in

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1. Carbonate of Copper. 2. Green Carbonate of Copper, or Malachite

3. Arseniate of Copper. 4. Phosphate of Copper.

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oblique four-sided prisms. The crystals are translucent, the massive varieties only translucent on the edges or opaque. It is brittle, and yields to the knife. Its specific gravity is 3·66. Before the blow-pipe it decrepitates, and becomes black. Its constituents are, copper 58, carbonic acid 18, oxygen 12·5, water 11·5. *Klaproth.* It occurs principally in veins, with other ores of copper in various parts of the world.

Compact Malachite. Pl. XXXVI. fig. 2, occurs most frequently in mamillated or reniform concretions, botryoidal, tuberose, stalactitic, cellular, and amorphous. Its colour is emerald and verdigris green, and the lustre is shining and silky. It is opaque, rather brittle, and easily frangible. Compact malachite bears a fine polish, and is sometimes used as a green pigment.

Sp. 9. Arseniate of Copper. Pl. XXXVI. fig. 3.—Strahlenkupfer, *Karsten*; Cuivre Arseniaté, *Hauy*.—Copper combined with arsenic presents several sub-species or varieties, differing greatly in form and colour. The arseniate of copper may, however, be readily distinguished from the carbonates by the following chemical characters: "When pulverised," says Mr. Bakewell, "it immediately communicates a blue colour to ammonia; it decrepitates on charcoal before the blow-pipe, emitting arsenical vapours, and the parts in contact with the charcoal, are reduced to the metallic state; and it dissolves without effervescence in nitric acid." All the varieties are found in the copper-mines of Cornwall.

Octahedral Arseniate Diprismatic, Olivenite, or Lenticular Copper.—Linsenerz, *Werner*; Cuivre arseniate primitif, *Hauy*.—Its usual colour is sky-blue; it occurs sometimes apple or grass-green, crystalized in obtuse octahedrons, nearly lenticular. It is semi-transparent or translucent; the lustre is vitreous; it is brittle; the fracture is uneven; and it yields to the knife. The specific gravity is 2·88. It contains peroxide of copper 49, arsenic acid 14, water 35. *Chenevix.*

Hexahedral Arseniate.—Cuivre arseniate lamelliforme, *Hauy*; Copper mica, *Jameson*.—This variety is generally of a pure emerald green colour, with considerable lustre and transparency. It occurs massive, and in thin hexagonal tables, with a distinct lamellar structure parallel to the hexagonal planes. It is softer

than calcareous spar. Before the blow-pipe with borax, it yields a globule of copper. Its specific gravity is 2·5. It consists, according to Chenevix, of 58 oxide of copper, 21 of arsenic acid, and 21 of water.

Trihedral Arseniate of Copper occurs massive, and crystalized in irregular octahedrons, tetrahedrons, and in acute rhomboids. Its colour is deep blueish-black, with a shining lustre. The specific gravity is 4·2. It consists of oxide of copper 54, arsenic acid 30, water 16. *Chenevix.*

Prismatic Arseniate, or Oliven Ore. The colour of this variety is olive-green or blackish-green. It occurs crystalized in small acute octahedrons; also granular and capillary. The specific gravity is 4·2. Its constituents are, oxide of copper 60, arsenic acid 39·7.

Wood Copper, or Fibrous Oliven Ore, occurs of various shades of brown, green, and yellow, and is found incrusting other arsenites of copper, and also in mamillated concretions. It consists of 50 oxide of copper, 29 arsenic acid, and 21 of water.

Amianthiform Arseniate of Copper has usually a blueish or grass-green colour. It occurs in fine parallel or diverging flexible fibres, or in plates. Its chemical composition is the same as that of the preceding variety.

Martial Arseniate of Copper is of a pale blue or greenish-blue colour. It occurs crystalized in minute rhomboidal prisms, which are sometimes grouped in globular concretions. The lustre is vitreous. It is transparent, or translucent, and harder than calcareous spar. Its constituents are, oxide of copper 22·5, oxide of iron 27·5, arsenic acid 23, water 12, silex 6. *Chenevix.*

Sp. 10. Prismatic Olivenite, or Phosphate of Copper. Pl. XXXVI. *fig.* 4.—Phosphorkupfererz, *Werner*; Cuivre phosphate, *Hauy*.—The colours vary from emerald-green to blackish or yellowish-green. It occurs massive, reniform, in fibrous distinct concretions, and crystalized in oblique four-sided prisms. It is opaque, translucent, with a vitreous lustre, inclining to pearly. The fracture is splintery; the fragments wedge-shaped, splintery, or indeterminate angular. The streak is verdigris-green; it is brittle, and easily frangible. Before the blow-pipe it melts into a brownish

globule. Its constituent parts are, peroxide of copper 68·13, phosphoric acid 30·95. *Klaproth.* Phosphate of copper is a rare mineral, and is found principally at Virneberg, on the Rhine. where it occurs along with quartz, calcedony, red copper ore, and malachite, in greywacke.

There are some other species, but they are of little importance to the metallurgist, being never worked exclusively as ores of copper. The sulphurets are the ores from which the metal is usually extracted. The method of reducing them consists essentially in driving off the sulphur, oxidizing the iron, and converting it into silicate, while the metal is separated in a tolerably pure state. In Cornwall the ore is broken into small pieces, and roasted in a reverberatory furnace for about twelve hours, occasionally stirring it, so as to expose new surfaces to the air. It is then put into a small furnace, and brought to a state of fusion, sometimes mixed with a little lime, to increase the fusibility. As the impurities collect at the top, they are raked out, and put into oblong moulds, in which they are allowed to cool: they then form a hard mass, which is used in building. The fused copper is drawn out through a hole in the lower part of the furnace into an adjoining pot filled with water; fresh quantities of roasted ore are then put in, and the process is in this way carried on for a considerable time. By this process the metal is reduced to the granular state; it is still, however, impure, being mixed with sulphur and arsenic. To free it from these the metal is repeatedly subjected to the heat of a reverberatory furnace, and each time put into the well. During these processes, the slag (silicate of iron) collects on the surface of the fused metal, but as this contains a considerable quantity of copper, it is kept, and mixed with the fresh ore, previous to its being put into the furnace. The copper, after this, is kept at a low red heat for two days, and is then repeatedly fused, and cast into moulds about fourteen inches in length. It is lastly put into the refining furnace, with a little charcoal, in which it is again fused. If, after this, it bear the hammer, it is fit for sale.

Pure copper has a yellowish-red colour, and considerable lustre. It has a disagreeable styptic taste, and emits a peculiar fœtid odour

tharides, it is sometimes used as an application for destroying warts and other excrescences. It is also used as a useful stimulant to change the surface of foul ulcers, and for checking the growth of fungus, being applied under the form of ointment, mixed with lard. Combined with vinegar and honey it forms the *Oxymel Æruginis* of the pharmacopœias, and has long been applied to the same purposes; but a solution of the sulphate of copper in common oxymel, is recommended by Mr. Brande as a preferable substitute.

Ammoniated Copper, *Cuprum Ammoniatum,* Ph. L.—This salt is usually prepared by triturating two parts of the sulphate of copper with three of the carbonate of ammonia, the carbonic acid of the latter being disengaged, while the ammonia combines with the sulphate. It is of a rich blue or violet colour, and has a saline styptic taste. The ammoniated copper has been given, apparently with advantage, as a tonic and antispasmodic, in chorea, epilepsy, and dysphagia. The dose is half a grain, gradually increased to five grains, given twice or three times a-day, in the form of pill.

All the salts and oxides of copper are poisonous. Verdigris, which is one of the most active of these poisonous preparations, is sometimes taken in the food in a state of solution in wine or vinegar, or in combination with oily matters. The ordinary symptoms are a peculiar coppery taste in the mouth, dryness and constriction of the throat, nausea, constant ptyalism, violent headache, vomiting, and griping pains in the stomach and bowels. The alvine dejections are sometimes bloody, sometimes black; the pulse small, hard, quick, and irregular; ardent thirst, cold sweats, vertigo, cramps in the lower extremities, jaundice, and, when the case ends fatally, convulsions very generally precede death. The appearances after death are chiefly marks of inflammation, or of gangrene in the alimentary canal. In some instances the intestines have been found perforated by ulceration, and their contents discharged into the sac of the peritoneum. Sugar and syrups have been considered the best antidotes for the poison of copper. From the experiments of M. Orfila on dogs, however, it appears that sugar only acts as an emollient after the poison has been expelled from the stomach, and that it produces no effect if retained by a ligature on

1.2. Oxide of Tin, or Tinstone. 3. Sulphuret of Tin or Tin Py
4. Grey Sulphuret of Antimony.

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the gullet.* He found that albumen, or the white of eggs, given in large quantities of water, is the most effectual counter-poison for all the preparations of copper. The ferro-prussiate of potash has likewise been found an equally powerful antidote.†

Genus VI.—TIN.

Etain. Fr.; *Stagno*, It.; *Estano*, Sp.; *Zinn*, Ger.; *Tin*, Sax. Dut. Dan.; *Teun*, Swed.; *Olowo*, Russ.; *Resass*, Arab.; *Runga*, Hind.; *Yang-seih*, Chin.

Tin appears to have been known from the most remote antiquity, for we find it mentioned in the works of Moses,‡ and both the coins and the weapons of the ancients were made of an alloy of tin and copper. According to Pliny, the Phœnicians and Carthaginians procured it from Spain and Britain, with which nations they carried on a lucrative commerce.‖ Tin has never been discovered pure in nature, but exists either in the state of a peroxide, or of a double sulphuret of tin and copper. The ores of this metal are by no means universally diffused; they have been found and worked chiefly in England, in Germany, and in many parts of the East Indies; and they occur only in that description of rocks which geologists call primitive, from supposing them to constitute the most ancient parts of the earth's surface. The ores of tin are distinguished by their great hardness and specific gravity. Nearly all the tin of commerce is obtained from the ore denominated tin-stone, or the peroxide of tin and iron.

Sp. 1. Tinstone, or Oxide of Tin. Pl. XXXVII. fig. 1, 2.—Zinnstein, *Werner*; Etain oxidé, *Hauy*; Tinstone, *Jameson*, iii. p. 439.—The prevailing colours are yellowish-brown, dark-brown, or reddish-brown, hair-brown, and velvet-black. It occurs in rounded masses, which are in general more or less crystaline; but commonly in regular crystals. The most common form of the

* *Toxicologie Generale*, vol. i. p. 535. † *Ibid*. vol. i. p. 541.
‡ *Numbers* xxxi. cap. 22.
‖ *Hist. Nat*. lib. iv. cap. 34, and lib. xxiv. cap. 47.

crystals is a rectangular four-sided prism, terminated by four-sided pyramids, fig. *b*; another form, the dodecahedron, with triangular planes, is represented fig. *c*. The primitive form is an obtuse octahedron, fig *a*. The structure of the crystals is lamellar; externally they are splendent, the cross fracture is uneven, and the lustre shining or resinous. Tinstone varies from semitransparent to opaque: it gives sparks with steel; it is very heavy, brittle, and yields a greyish-white streak. Its specific gravity is 6·970. Before the blow-pipe pulverised tinstone decrepitates, and is reduced to the metallic state. Its constituents are, tin 77·5, iron 0·25, oxygen 21·5, silica 0·75. *Klaproth.*—This ore occurs disseminated, in veins or beds, in granite, gneiss, mica-slate, and clay-slate. Cornwall is the most considerable repository of this mineral in Europe. It is also found in considerable abundance in the Saxon Erzgebirge; in Monte Rey, in Gallicia, in Spain, and in various parts of Asia and South America. The grains and fragments of tinstone found in alluvial soil are separated from the earthy matter by passing streams of water over them, whence these grains are called *stream-tin.* Tinstone is readily distinguished from *wolfram* by its extreme hardness; from *blende* by its superior hardness, and by its not emitting a sulphurous odour when triturated; from *garnet* by its peculiar lustre and density; and from *shorl* by its colour, form, and greater specific gravity.

Wood Tin.—Kornisch Zidnerz, *Werner*; Etain oxidé concretionne, *Hauy.*—It is found with stream-tin in reniform, globular, botryoidal, and wedge-shaped pieces. Its most common colour is hair-brown. The structure is divergingly fibrous, with concentric lamellæ; the lustre is glistening and silky: it is opaque, softer than common tinstone, and brittle. Its specific gravity is 6·4. It consists, according to Vauquelin, of tin 91, oxide of iron 9. It is readily distinguished from *brown hematite* by its greater hardness and superior specific gravity.

Tin Pyrites.—Zinnkies, *Werner*; Etain sulphuré, *Hauy.*—The colour of this ore varies from steel-grey to brass-yellow; the lustre is glistening and metallic. It occurs massive and disseminated. Its fracture is even, and sometimes conchoidal. It yields easily to the knife, and is brittle. Its specific gravity is 4·3. Its

constituents are, tin 34, copper 36, sulphur 25, iron 2. *Klaproth.* It has been found only in Cornwall.

The purest and best metal, known in commerce by the name of *grain tin,* is smelted from stream tin, whilst the article called *block tin* is extracted from the ore dug out of veins. After the ore is obtained from the mines, it is reduced to powder in a stamping-mill; it is then washed carefully, and the oxide being mixed with one-fifth of its weight of coke, is roasted in a reverberatory furnace, through a hole in the bottom of which the metallic tin flows into a vessel below. It is afterwards fused in an iron boiler, where it is freed from the scoria which covers it, and finally purified by the addition of charcoal. The metal is usually cast into small bars, or ingots for exportation.

Tin has a silvery-white colour, which, by exposure to the air, acquires a slight superficial tarnish. It feels greasy, and emits a peculiar and rather fetid odour when rubbed. It is very soft and malleable, but has little ductility and tenacity. When bent backwards and forwards, it occasions a peculiar crackling noise. Its specific gravity is 7·3; it melts at 442; and if it be then stirred rapidly while it gradually cools, it is obtained in the form of a fine granular powder, which is the *Pulvis Stanni* of the pharmacopœias. There are two oxides of tin. When tin is exposed to heat in an open vessel, it absorbs oxygen, and is converted into a grey powder. The protoxide may also be obtained by pouring diluted muriatic acid upon tin filings, and leaving them in contact forty-eight hours. It may then be separated from the acid by decomposing it by the action of an alkali. The peroxide may be obtained either by heating the protoxide, as we have just stated, or by the action of nitric acid, slightly diluted, upon the metal. A white powder is produced, which is a hydrate of the peroxide, from which the water may be expelled by a red heat. The peroxide of tin is of a straw-yellow colour: it is commonly known under the name of *putty* powder, and is used for staining glass and polishing silver-plate. Both of the oxides of tin form salts by uniting with acids. Tin combines with chlorine in two proportions. The protochloride may be obtained by boiling tin in a state of minute division, in muriatic acid; the perchloride may be obtained by exposing tin to the

action of chlorine, and heating it. The salts formed by the solutions of the chlorides of tin in water are much used in dyeing, in consequence of the strong affinity they have for colouring matter. Several of the acids act very readily on tin: the nitro-muriate of tin is used as a test of gold and platina, giving a purple precipitate with solutions of the former, and an orange one with those of the latter. Tin forms two compounds with sulphur: one of these, the bi-sulphuret, may be made by heating together, in close vessels, the peroxide of tin and sulphur. It is well known by the name of *Mosaic gold*, and is used as a pigment for giving a gold colour to some works of art. The alloys of tin with copper in various proportions form brass. An amalgam of tin and mercury is largely employed for silvering the backs of mirrors, and for other purposes in the arts. It forms pewter with zinc and small portions of other metals, and an alloy of tin with antimony is used for the reflectors of telescopes.

Medical Properties.—Tin, in its metallic state, has no action on the human body; but it was formerly esteemed tonic, and employed as a remedy in chorea and epilepsy. The powder of tin and tin filings have been recommended by Dr. Alston as powerful anthelmintics, given in doses of two or three drachms in a morning, and followed by a brisk cathartic. Both these preparations, however, have been known to prove highly deleterious, the metal being rendered poisonous by slight oxidation, when given in the first form, and creating great irritation in the last. The oxide and hydrochlorates of tin are poisonous. They have been found to occasion violent local irritation, colic, diarrhœa, and other dangerous symptoms.

Genus VII.—ANTIMONY.

Antimoine, Fr.; *Antimonio*, It.; *Antimonio*, Sp.; *Spiessglas metall*, Ger.

Antimony is found in small quantities native, and in occasional admixture with ores of silver, lead, and copper, but it is from its combination with sulphur, in which state it occurs abundantly in Auvergne, Hungary, and Scotland, that the antimony of commerce is obtained. The ancients were unacquainted with metallic

antimony, but they appear to have used some of its ores medicinally.

Sp. 1. NATIVE ANTIMONY.—Gediegen spiesglas, *Werner*; Antimoine natif, *Hauy*,—Its colour is tin-white, sometimes externally tarnished. It occurs massive and crystalized in octahedrons and rhomboidal dodecahedrons. Its structure is lamellar, with a splendent metallic lustre. It is harder than calcareous spar. The specific gravity is 6·7. It consists of 98 antimony, 1·0 silver, and 0·25 iron.

Sp. 2. GREY SULPHURET OF ANTIMONY, or ANTIMONY GLANCE. PL. XXXVII. fig. 4.—Grau Spiesglaserz, *Werner*; Antimoine sulfuré, *Hauy*.—Its colour is lead-grey. It occurs massive disseminated, in distinct concretions, which are radiated, fibrous, and granular; also crystalized in four, six, ten, or twelve-sided rhomboidal prisms. The lustre varies from glistening to splendent and metallic. It is extremely soft, yields easily to the knife, and soils the fingers. The specific gravity is from 4·10 to 4·50. It melts in the flame of a candle, and when placed before the blow-pipe on charcoal it is principally volatilized in the form of a white vapour, with a sulphureous odour. Its constituent parts are antimony 74, sulphur 26 = 100. *Bergman*. Sulphuret of antimony is found in beds and veins in transition rocks. In Dumfrieshire, it occurs in veins traversing greywacke; in Cornwall, in veins accompanying copper and tin. There are considerable deposits of it on the continent, and also in America.

In its impure state this mineral is very rarely used, but it forms the basis of several important and valuable medicinal preparations. To free it from the earthy matters with which it is naturally combined, the ore, mixed with charcoal, is exposed to heat in a covered earthern crucible perforated at the bottom; the sulphuret is melted and is received into another crucible, placed below the former, while the impurities remain. It is then cast into the form of loaves or large cakes, and is termed *crude antimony*, to distinguish it from the pure metal or *regulus* as it was formerly called. These loaves have a grey or blueish-black colour externally; they are opaque, and when broken present a striated texture and metallic lustre. When reduced to powder and thrown into water, the

coarse part of the powder immediately falls to the bottom, while the finer particles are kept suspended for some time; and on pouring off the water, and allowing them to subside slowly at the bottom of the vessel, an inodorous, insipid, blackish powder is obtained, which is the *Sulphuretum Antimonii præparatum* of the Edinburgh and Dublin Colleges. This substance was used by the ancients in collyria against inflammations of the eyes; and for staining the eye-brows black. Internally, it has been prescribed as a remedy in gouty and rheumatic affections, in scrofula, and particularly in chronic cutaneous eruptions. In a dose of from gr. x. to ʒii. it acts as a sudorific, but the uncertainty of its operation and its occasional violent action, prevents it from being generally used in practice. When there is no free acid present in the stomach it produces scarcely any sensible effect on the system; but when this is the case, it becomes oxidated, and proves violently emetic and cathartic.

From the grey sulphuret all the preparations of antimony which have been applied to medical use are directed to be made in the British pharmacopœias. They have been divided into those in which the metal is combined with oxygen, and those in which it is brought into a saline state by combination with acids. Though these preparations are of very different degrees of strength, they all retain the same mode of action, and possess, therefore, the same medicinal virtues. They do not exert any general operation on the system, but are always directed in their action to particular parts, so as to occasion some sensible evacuation. Their general effects are diaphoresis, nausea, full vomiting, and purging; but their determination to particular organs depends partly on the dose, partly on the state of the stomach, and partly too on the nature of the preparation. In all cases where it is desirable to promote the secretions in general, and those of the skin and alimentary canal, in particular, it is proper to have recourse to antimonial remedies. In the treatment of intermittent as well as continued fever, in the phlegmasiæ and exanthemata, antimony has long been more or less extensively used. It is given either so as to excite diaphoresis, or in larger doses to induce nausea, vomiting, and purging, which may perhaps be best obtained by the form of emetic tartar.

Oxides of Antimony.

Oxide of Antimony. *Antimonii Oxydum.* Ph. L.—If to a solution of tartarised antimony we add a solution of subcarbonate of ammonia, and gently boil the mixture, a protoxide of antimony will be precipitated, which should be washed with plenty of hot water, and then dried. It is of a dirty white colour, fuses at a red heat, and forms on cooling an opaque crystaline mass. The oxide of antimony is very violent in its operation, and is scarcely ever employed in practice. Its dose is from one to ten grains. A similar preparation has a place in the Dublin Pharmacopœia, under the name of *Oxidum Antimonii Nitro-Muriaticum.* It is used merely for preparing tartar-emetic.

Sulphuretted Oxide of Antimony. *Antimonii Oxydum sulphuretum vitrificatum. Antimonii vitrum,* L. E. Glass of Antimony.—According to Proust, this is a compound of the protoxide of antimony with about an eighth part of sulphuret of antimony. It is a transparent glass of a reddish-brown colour, and is prepared by exposing the sulphuret to a high temperature in an open vessel. The sulphur is dissipated, the antimony is oxidated, and, by the intensity of the heat, the oxide is vitrified. It acts as a diaphoretic, emetic, or cathartic, but its operation is so violent, and, at the same time, so uncertain, that it is never prescribed. Its chief use is for the preparation of some other antimonials, and it is employed by the Edinburgh College for the preparation of emetic tartar. The *Crocus,* or *Saffron of Antimony,* (*Crocus Antimonii*), or what is now named by the Edin. College, *Oxidum Antimonii per Nitratem Potassæ,* consists of four parts of the protoxide and one of the sulphuret of antimony. It is obtained by throwing equal parts of nitre and the sulphuret of antimony into a hot crucible, and separating the scoriæ and other saline substances by water. In this process, the greater part of the antimony is converted into a protoxide by the oxygen of the nitre, while the sulphur is at the same time acidified; part of it being dissipated in the form of sulphurous acid, and the rest entering into combination with the potash of the nitre. A compound which has long

been known by the name of *Crocus metallorum*, or *Liver of Antimony*, is merely the glass of antimony containing a larger quantity of the sulphuret. The *Pulvis Algarotti* is a protoxide of antimony, with a small portion of the muriatic acid; and is the *Oxidum Antimonii Nitro-muriaticum* of the Dublin College, and is used only in the preparation of emetic tartar.

Vitrified Oxide of Antimony with Wax, formerly *Vitrum Antimonii Ceratum*, is prepared by adding eight parts of vitrified oxide of antimony, with sulphur, to one part of melted wax, and exposing them to a moderate heat for a quarter of an hour, stirring constantly with a spatula. The matter is then poured out, and, when cold, it is ground into a fine powder. By this process, the antimony is rendered much milder in its operation. It was formerly regarded as a specific in dysentery, but as it possesses no advantages over other antimonials, and is moreover very uncertain in its operation, it is never employed in the present practice. Its dose was from five to fifteen grains, and its principal operation was that of a cathartic.

Precipitated Sulphuret of Antimony. *Antimonium Sulphuretum Precipitatum.*—Of this there are three varieties, differing in the proportion of their elements. The first is what used to be named *Kermes Mineral*, and is now called by the Dublin College *Sulphur Antimoniatum fuscum*. It is a compound of the protoxide of antimony with sulphuretted hydrogen, and a small portion of sulphur. To prepare this compound, sulphuret of antimony must be fused with an equal weight of subcarbonate of potash, and boiled in water; the liquor is to be strained while hot, and, on cooling, the kermes is deposited of a brick-red colour. In this process a portion of the water is decomposed, its oxygen combines with the antimony, and its hydrogen with the sulphur; the antimony being converted into a protoxide, and the sulphur into sulphuretted hydrogen, the latter partly combining with the protoxide and partly with the potash. If dilute sulphuric acid be added to the cold liquor, a precipitate is obtained which has been called the *Golden Sulphuret of Antimony*; it is of a bright orange colour, and differs from kermes in containing a larger quantity of sulphur. When a diluted acid is added to the liquor while it is

hot, and before any kermes is precipitated, a compound is thrown down, which is the *Sulphuretum Antimonii precipitatum* of the pharmacopœias. It is of a brown colour, and consists of protoxide of antimony, sulphuretted hydrogen, and sulphur, the quantity of the latter ingredient being intermediate between that in the kermes and the golden sulphuret. These preparations of antimony possess the same medicinal qualities, and are used in the same cases as the crude sulphuret. They have been used principally as a diaphoretic and sudorific; but they are liable to the same uncertainty in their operation as the other oxides, and are therefore seldom prescribed. Combined with calomel, the yellow hydro-sulphuret has been employed as a useful alterative in porrigo, herpetic and other cutaneous eruptions, in obstinate ulcers, in many anomalous diseases, in glandular affections, and morbid enlargements of the breast and testicle. It is given in a dose of from gr. i. to gr. iv., twice a-day, usually under the form of a pill.

Antimonial Powder. *Pulvis Antimonialis*, Ph. L.—This is a peroxide of antimony, combined with phosphate of lime, and is intended as a substitute for an emperical remedy called James's Powder, which still maintains a deserved celebrity as an antimonial. It is prepared by exposing equal weights of the sulphuret of antimony and hartshorn shavings to a red heat in an iron pot, stirring it till it becomes of an ash-grey colour; it is then exposed, under cover, to a white heat for two hours, a small aperture being left to allow the escape of any gas. In this process the sulphur of the sulphuret is expelled, and also the gelatin of the hartshorn, the phosphate of lime remaining, either mechanically mixed or chemically combined with the antimony in the state of protoxide. The antimonial powder, however, when prepared in this manner, is far less uniform in its operation than James's powder, the antimony being either volatalized during the operation, or a mixture of the peroxide of antimony and lime is obtained, which is nearly, if not altogether inert. Antimonial powder has been given as a sudorific in the commencement of fevers and inflammatory affections. Its dose is from grs. iii. to grs. viii., repeated every four or six hours, till its effects are obtained. In large doses it operates as an emetic and cathartic. It is sometimes prescribed in acute rheumatism, combined with camphor, calomel, and

opium; and with calomel and guaiacum in several cutaneous diseases.

Salts of Antimony.

Tartarized Antimony, *Antimonium tartarizatum.* L.—This compound, commonly called *Tartar Emetic*, is by far the most important and valuable of all the antimonials. It is usually prepared by boiling the protoxide of antimony along with the bi-tartrate of potash, the oxide combining with the bi-tartrate, and forming a soluble compound, which crystalizes on cooling. The London College uses *two ounces* of the sulphuret of antimony, *one ounce* of nitrate of potash, and *two ounces* of sulphuric acid, boiling them in a *pint and a half* of distilled water. The process recommended by Mr. Phillips, consists in oxidizing the sulphuret of antimony by boiling it to dryness with twice its weight of sulphuric acid. The gross weight of which, obtained in this manner, being well washed, is then digested in a quantity of boiling water, with its own weight of cream of tartar, and evaporated to the density of 1·161, after which it is filtered hot. On cooling, crystals of the triple tartrate are obtained. Pure tartar emetic crystalizes frequently in small triedral pyramids. The primitive form of its crystals is the regular tetrahedron, but it assumes a variety of secondary forms. The crystals are colourless, transparent, inodorous, and have a somewhat nauseous, styptic, metallic taste. They effloresce slightly when exposed to the air, and, when pounded, form a powder of a fine white colour. According to Dr. Duncan, they are soluble in fifteen parts of cold water, and in three parts of water at 212°. The solution is transparent and colourless and is decomposed when kept for a considerable time; and is also decomposed by heat, the mineral acids, alkalies, and earths. The hydro-sulphurets, bitter and astringent vegetable substances, and many salts, produce the same effect. The infusion of galls is the most delicate test by which the presence of this compound is detected, giving a dirty white precipitate.

The tartarized antimony is emetic, diaphoretic, expectorant, alterative, and externally rubefacient. It is, says Dr. Murray, superior to all the other antimonials in the certainty of its operation at least as an emetic, and, from its solubility, is more manageable with regard to the dose. It usually excites vomiting in the dose of

from one to two grains; but the proper mode of administering it is in divided doses, three or four grains being dissolved in four ounces of water, and one ounce of this solution being given every quarter of an hour till it operates. It is more severe in its operation than the milder emetics, such as ipecacuanha, evacuating not only the contents of the stomach, by inverting even the motion of the duodenum; it also frequently acts as a cathartic. In smaller doses, it has been employed as a nauseating remedy in fevers, and to diminish the frequency of the pulse in many inflammatory diseases. Assisted in its operation by tepid diluents, it is given in the dose of from one sixteenth to one fourth of a grain as a diaphoretic; and the same, or a smaller dose, combined with squill, ammoniacum, or camphor, is frequently prescribed as an expectorant. In still smaller doses, combined with calomel, it is employed as an alterative in many cutaneous diseases; and in rheumatism and gout it is frequently combined with opium. Applied to the skin by friction, it excites inflammation, and occasions a local pustular eruption; hence it is frequently used in phthisis, mania, some diseases of the eyes and joints, and in many deep seated inflammations, as a counter-irritant. For this purpose, it is usually employed in the form of ointment, made by rubbing ʒi. of tartarized antimony with ℥i. of prepared lard.

This salt, when taken in an over-dose, acts as a corrosive poison. The best antidote is a strong decoction of yellow cinchona bark, or, when this is not at hand, a strong infusion of tea may be administered; and any signs of inflammation left will be subdued by venesection.

Chloride of Antimony, formerly Muriate of Antimony. *Murias Antimonii,* Ph. Ed.—This salt is generally prepared by exposing one part of metallic antimony to heat with rather more than two parts of corrosive sublimate (bi-chloride of mercury.) The chlorine of the latter combines with the antimony, and is separated by distillation. It is at first of a peculiar soft consistence, and was formerly called *Butter of Antimony.* On exposure to the air, it slowly deliquesces, and then forms a dense heavy liquid of a deep brown or blackish colour. This preparation is sometimes used externally as a caustic.

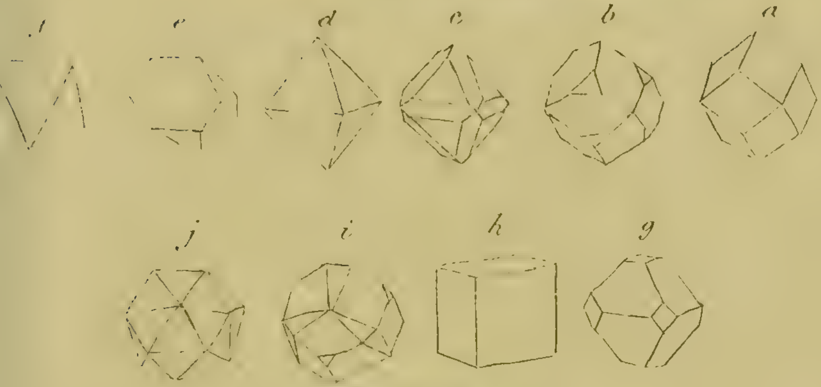
Genus VIII.—ZINC.

Zinc, Fr.; *Zinco*, It.; *Zink*, Ger.; *Tootanagum*, Tam.; *Pi-yuen*. Chin.

This metal exists in nature mineralized with sulphur or with oxygen, and also with carbonic and sulphuric acids. The zinc of commerce is principally obtained from calamine, a native oxide of zinc, which contains a portion of carbonic acid. The ores of zinc are generally associated with lead-ores, and are found abundantly in various parts of England, particularly in veins in the mountain limestone of Derbyshire, Durham, Cumberland, Yorkshire, Somersetshire, and North Wales.

Sp. 1. Sulphuret of Zinc, or Blende. Pl. XXXVIII. fig. 1. —Granat-Blende, *Mohs.*; Zinc sulfuré, *Hauy.*—Its colours are yellow, brown, and black. It occurs massive, disseminated, in granular concretions, and crystalized, in many varieties of form, of which the primitive is, according to Hauy, the rhomboidal dodecahedron. Mr. Phillips says the varieties amount to not fewer than fifty, some of which are represented on the annexed plate. Fig. *a*, represents the primitive; fig. *b*, the same with the solid angles replaced by triangular planes, which, in fig. *c*, are increased greatly, forming the passage of the rhomboidal dodecahedron into the regular octahedron, fig. *d*. Fig. *e*, is an octahedron, which has received an increase of the crystaline laminæ, progressively diminishing in size, on two opposite faces of the upper pyramid, and on the other opposite faces of the lower pyramid; this crystal forms the passage of the octahedron into the tetrahedron, fig, *f*. Fig. *g*, is a regular octahedron, of which the solid angles are replaced by quadrangular planes, which are increased in fig. *h*, the cube. Fig. *i*, is a variety of the rhomboidal dodecahedron; and fig. *j*, a crystal bounded by twenty-four equal and similar triangular planes. The lustre varies from resinous to metallic, and from shining or splendent to adamantine. It is translucent or opaque. The structure is laminar, with six distinct cleavages. It yields readily to the knife, which distinguishes it from *tinstone*;

1.



2.

1. Sulphuret of Zinc, or Blende.
2. Carbonate of Zinc, or Calamine.

el. et lith.

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it is moderately brittle and easily frangible. The specific gravity is from 3·7 to 4. It is infusible before the blow-pipe. The massive brown blende of Allonheads in Northumberland, consists according to Dr. Thomson, of zinc 58·8, sulphur 23·5, iron 8·4, silica 7·0. Blende may be distinguished from *galena* by its streak and powder, which are yellowish grey, and from other ores which resemble it by the sulphureous odour it emits when thrown into an acid, or triturated in a mortar. Blende is found in all the lead-mines in England and Scotland, and also in those on the continent. The common name given to this mineral by the English miners is *black jack.*

Sp. 2. CARBONATE OF ZINC, or CALAMINE.—This ore, as Mr. Bakewell justly observes, has not the appearance of a metallic mineral. The colours are various shades of white, grey, greenish or yellowish-grey and also brown. It is divided by some mineralogists into three sub-species; viz. sparry calamine, compact calamine, and earthy calamine. *Sparry Calamine* occurs crystalized in acute or obtuse rhomboids and in four-sided tables, either perfect or variously modified. The external lustre of the crystals is between vitreous and resinous; the structure is imperfectly laminar; it is more or less transparent, and yields easily to the knife. The specific gravity is about 4·30. It is infusible, but looses about 34 per cent. by ignition; it dissolves with effervescence in muriatic acid. Its constituents are oxide of zinc 65·2, carbonic acid 34·8—100. *Smithson. Compact Calamine* is opaque and has less lustre than the crystalized; its colours are grey, yellow, and yellowish-brown. It occurs in stalactitical, reniform, or botryoidal masses, also cellular, and in pseudo-morphous crystals, (Pl. XXXVIII. fig. 2,) and incrusting other minerals. It is opaque or slightly translucent on the edges, dull, very feebly glimmering and resinous. The fracture is granular, splintery, even or flatly conchoidal. *Earthy Calamine* is greyish, yellowish-white, or yellowish brown, and is earthy, dull, and soft, yielding to the nail. That of Bleiberg, in Carinthia, consists, according to Smithson, of oxide of zinc 31·4, carbonic acid 13·5, water 15·1 = 100·0.

Calamine, after it has been calcined and reduced to a fine powder by levigation, (*Calamina præparata,* Ph. L.) is used medi-

cinally as an external application to superficial inflammations and excoriations, dusted on the part, and it forms the basis of the common healing cerate.

Sp. 3. Electric, or Prismatic Calamine.—Prismatischer Zink-Baryt, *Mohs.*; Zinc oxydé, *Hauy.*—This species is so called from its becoming strongly electric when gently heated. Its most common colours are white and yellow; it also occurs green, grey, yellow, and brown. It occurs massive, disseminated, laminar, stalactitic, reniform, botryoidal, cellular, corroded, and crystalized, either in small crystals or in groups scopiformly aggregated like zeolite. The secondary forms are numerous, but, according to Hauy, the octahedron is the primitive form. The lustre is pearly, inclining to adamantine; it varies from transparent to opaque. It yields to the knife, but is harder than calamine. The specific gravity is 3·4. It is infusible; but dissolves in muriatic acid. Its constituents are oxide of zinc 68·3, silica 25, water 4·4. *Smithson.* It is found in small quantities principally along with the ores of lead.

Sp. 4. Red Zinc Ore. It is of a blood or aurora red colour. It occurs massive and disseminated. The fresh fracture is shining, foliated; the cross-fracture is conchoidal. It is translucent on the edges, or opaque. It is brittle, easily scratched by the knife, and gives a browish-yellow streak. The specific gravity is 6·22. Its constituents are zinc 76, oxygen 16, oxides of manganese and iron 8 =100. *Bruce.* This ore has been hitherto found only in North America, where it occurs in great abundance in several of the iron-mines in Sussex county, New Jersey.

The most valuable ores of zinc from which the metal is extracted are Calamine and Blende. The ore, after being reduced to small fragments, and separated as much as possible from foreign matter, is commonly roasted, by which the sulphur of the former, and the acid of the latter, are expelled. The product is then washed, in order to separate the lighter matter, and the heavy part which remains is mixed with one eighth of its weight of charcoal. The mixture is next reduced to powder in a mill, in which state it is introduced into the pots or crucibles to be smelted. These pots resemble oil-jars in shape, and are arranged round a circular fur-

nace, vaulted above. Through the bottom of each there passes a tube of iron, the upper end of which terminates by an open mouth near the top of the pot. The lower end goes through the floor of the furnace into a vessel of water, situated in an apartment below. The pots are left open for about two hours, till the flame begins to assume a blue colour; indicating that the zinc is beginning to be reduced. They are then covered up on the top. The zinc is reduced, and gradually escapes through the iron tube into the water, where it is condensed in the form of globules. These are afterwards melted and cast into ingots.

Zinc is known in commerce by the name of *Spelter*; but usually contains an admixture of lead and sulphur. When purified from these, it is of a brilliant white colour, inclining to blue. Its specific gravity is about 6·8. It is brittle, except at a temperature between 200 and 300° of Fahrenheit, when it becomes both ductile and malleable, and retains its tenacity when slowly cooled. It is the most inflammable of the metals, burning with a brilliant flame when heated to ignition. It melts at about 725° of Fahrenheit's scale, and crystalizes on cooling. The principal use of zinc is in the formation of galvanic apparatus, and in electrical experiments. It has no sensible action on the system in its metallic state; but some of its compounds have been much used in medicine.

Oxide of Zinc. *Zinci Oxydum,* L. E. D.—When zinc is exposed to a temperature very little above its melting point, it attracts oxygen from the atmosphere, and burns vividly with a dazzling flame of a blueish tint, producing an oxide in the form of very light flocculi, formerly called *flowers of zinc* or *philosophical wool.* It is directed to be prepared by throwing the metal into a red hot crucible with another inverted over it to receive the oxide as it forms. This oxide, which is the only one known, is of a snow-white colour; it is inodorous, insipid, insoluble in water and alcohol, but entirely soluble in acids, and is not altered by exposure to the air. According to Proust, it consists of 80 of zinc, and 20 of oxygen in 100 parts. The oxide of zinc is tonic and antispasmodic, and has been employed in chorea and epilepsy in a dose of from one to five grains. The *Unguentum Oxidi Zinci* composed of one ounce of oxide of zinc and six ounces of prepared lard, is used

as a moderately astringent and stimulant application in some forms of cutaneous eruptions, ring-worm, sore nipples, and chronic inflammation of the conjunctiva, depending on a relaxed state of the vessels.

IMPURE OXIDE OF ZINC, or TUTTY. *Oxidum Zinci impurum,* E. *Tuttia,* D.—The nature and origin of this substance has not been well ascertained. According to Dr. Murray, it consists of oxide of zinc with argillaceous earth, and is supposed to be an artificial compound, prepared from the sublimed oxide of zinc that collects in the chimneys of the furnaces in which the metal is roasted, mixed with clay and baked. It is of a grey or brown colour, and earthy texture, and, when levigated, it is used for the same purposes as calamine.

Salts of Zinc.

Nearly all the acids act with energy on zinc, and form salts some of which have been used in medicine. They are, in general, soluble in water, and their solutions are colourless. They are decomposed by the alkalies, and afford white precipitates with sulphuretted hydrogen and the ferro-prussiate of potash.

SULPHATE OF ZINC. *Zinci Sulphas,* L. E. D.—This salt is prepared by pouring diluted sulphuric acid on zinc, and evaporating the solution so far that, on cooling, the sulphate is obtained in acicular crystals. In this process, the metal combines with the oxygen of the water and with the acid, a sulphate of zinc being formed while hydrogen gas is disengaged. It is usually prepared on a large scale from the common sulphuret or blende. The ore is roasted, wetted with water, and exposed to the air. The sulphuret attracts oxygen, and is converted into sulphuric acid; and the metal being at the same time oxidized, combines with the acid. After some time, the sulphate is extracted by solution in water; and the solution being evaporated to dryness, is run into moulds. When procured in this way, it generally contains a small portion of iron, and sometimes of lead. This salt, known in commerce under the name of white vitriol, is said to have been discovered in Germany about the middle of the 16th century. The form of its crystals is that of flat quadrangular prisms, terminated by four-sided pyramids.

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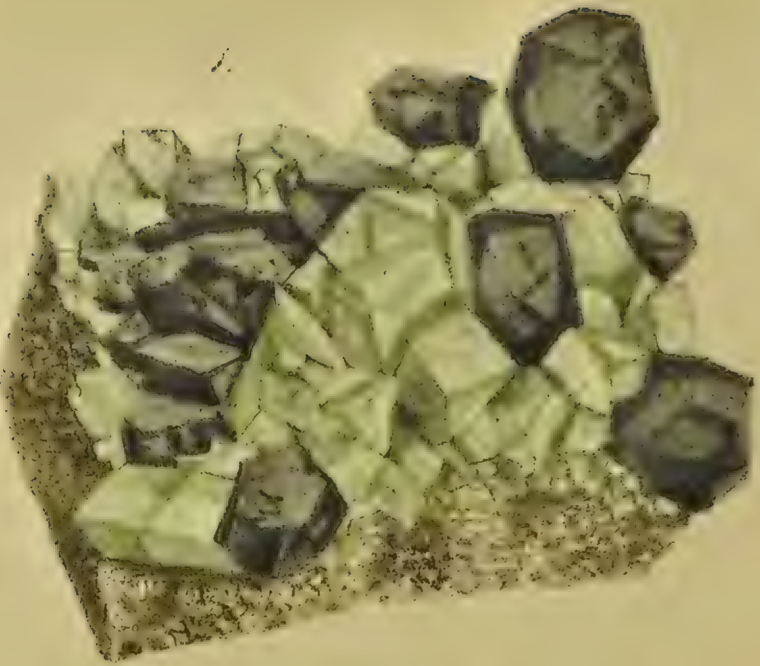

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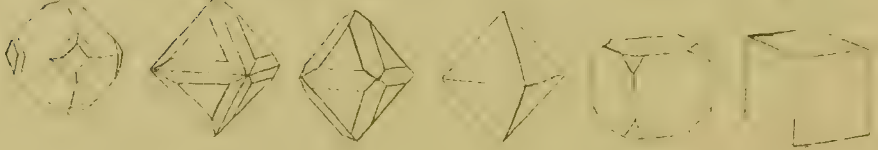

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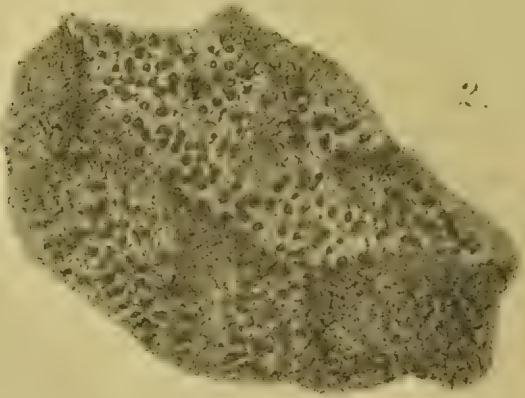

3

1. *Galena, or Sulphuret of Lead.* 2, *Compact Galena.*
3, *Native Minium.*

...ed by G. E. Madeley 3 Wellington St. Strand

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London Pub. by John Wilson, Oct. 1. 1831

At a temperature of 60°, it dissolves in about 2·5 times its weight of water, and in about an equal weight at 212°. It reddens the vegetable blues, and has a slightly acidulous, styptic, metallic taste. It is decomposed by the alkalies, earths, and hydro-sulphurets, and by astringent vegetable infusions. The sulphate of zinc is used internally in medicine as an emetic, astringent, and tonic. In a dose of from grs. x. to ʒss. it operates almost instantaneously as an emetic, and is frequently employed as such in cases where the stomach has been rendered torpid by the action of narcotic poisons. In a dose of one or two grains, given twice a-day, it has been employed as a tonic in intermittent fevers, dyspnœa, phthisis, fluor albus, and some convulsive affections, as pertussis, chorea, and epilepsy; also as an astringent in chronic dysentery. As an external application, a solution of this salt in water, in the proportion of grs. iss. to ℥i. of fluid, is the common astringent injection in gonorrhœa, and a little diluted forms a useful collyrium in the latter stages of ophthalmia. It is also used as a lotion in excoriations, and some kinds of superficial inflammations.

Acetate of Zinc. *Acetitis Zinci.*—This salt is formed by adding acetate of lead to a solution of sulphate of zinc, when sulphate of lead is precipitated, and the acetate of zinc remains dissolved. It is frequently used as an excellent collyrium in ophthalmia, and an astringent injection in gonorrhœa, and is less irritating than the solution of the sulphate.

Genus VIII.—LEAD.

Plomb, Fr.; *Piombo*, It.; *Plomo*, Sp.; *Chumbo*, Port.; *Blei*, Ger.; *Swinez*, Russ. *Soorb*, Pers.; *Anúk*, Arab.; *Sisa*, Hind.; *Hih-yen*, Chin.

Lead very rarely occurs in the native or pure state; it is generally found mineralized with sulphur, with oxygen, and with various acids, forming a great variety of ores.

Sp. 1.—Sulphuret of Lead, or Galena, Pl. XXXIX. fig. 1, 2.—Bleischweif, *Werner*; Plomb sulfuré, *Hauy*.—The colour

is lead-grey; the lustre metallic, and varying from splendent to glistening. It occurs in amorphous masses, disseminated and crystalized, in cubes and octahedrons. Fig. *a* represents the cube, which is the primitive form; *b*, the same truncated on the angles, forming the passage into the octahedron, fig. *c*. Fig. *d*, *e*, and *f*, represent various modifications of the octahedron. The structure is lamellar, granular, or compact. It is soft, sectile, and easily frangible. The specific gravity is 7·5. Before the blow-pipe it decrepitates and melts, emits a sulphureous odour, and globules of metallic lead are formed on the charcoal. A specimen from Durham, analysed by Dr. Thomson, contained, lead 85·13, sulphur 13·2. Some varieties, particularly the granular galena, or steel-grained lead ore, often contain a very considerable portion of silver. Sulphuret of lead occurs in beds and veins in primitive, transition, and secondary rocks, in various parts of the globe. The most productive lead veins in England intersect mountain-limestone in Derbyshire, Northumberland, Durham, Cumberland, and Yorkshire. Nearly all the lead of commerce is obtained from galena. After being broken in pieces the ore is washed, and then exposed to a strong heat in a reverberatory furnace, till the sulphur is all separated; it is then brought into a state of fusion with lime, and the scoria is raked off, while the lead is run out into moulds through an aperture near the bottom; in this state it is called *pig lead*. The silver is separated by converting the lead into litharge, and separating the silver from what remains by cupellation.

Sp. 2. Native Minium, or Native Red Oxide of Lead. Pl. XXXIX. fig. 3.—Plombe oxyde rouge, *Hauy*.—This is a scarce ore of lead; its colour is scarlet; it is massive, amorphous, and pulverulent. It occurs incrusting sulphuret of lead, and its properties are the same as the common red-lead of commerce.

Sp. 3. Carbonate of Lead, or White Lead-spar. Pl. XL. fig. 1.—Weiss Bleirz, *Werner*; Plomb carbonate, *Hauy*.—Its colours are white, yellow, brown, and grey; sometimes coloured green or blue by copper. It occurs massive, disseminated, in membranes, and crystalized. The primitive, a cuneiform octahedron, is represented fig. *a*, and some of the more common

1. *Carbonate of Lead.*
2. *Phosphate of Lead.*
3. *Arseniate of Lead.*
4. *Chromate of Lead.*

del. et lith.

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secondary forms are given on the same plate, fig. *b*, *c*, and *d*. The crystals are small, often long and acicular; also broad and tabular. It varies from translucent to transparent, and it refracts double in a high degree; the fracture is small conchoidal, and the lustre resinous or adamantine. It is brittle, and very easily frangible. The specific gravity is 6·72. Before the blow-pipe, it decrepitates and melts into a metallic globule. It consists of, oxide of lead 82, carbonic acid 16, water 2=100.—*Klaproth.* This ore occurs in small quantities in several of the English lead mines.

Sp. 4. Phosphate of Lead, or Green Lead-Ore. Pl. XL. fig. 2.—Grun bleierz, *Werner;* Plomb phosphate, *Hauy.*—Its colours are various shades of green, yellow, and white. It seldom occurs massive; sometimes stalactitic, reniform, and botryoidal; but most commonly crystalized in the form of a six-sided prism, fig. *e*; variously modified, fig. *f*, *g*, and *h*. The crystals are small, super-imposed, and sometimes form velvetty or mossy-like drusy crusts. They are smooth and shining, or splendent, externally; internally, glistening, and the lustre is resinous. It is more or less transparent, brittle, and easily frangible. The specific gravity is 6·4. It dissolves in acids without effervescence. It contains, oxide of lead 80, phosphoric acid 18, muriatic acid 1·62.—*Klaproth.* It occurs along with galena and other ores of lead in the northern counties of England; and also in Scotland.

Sp. 5. Arseniate of Lead. Pl. XL. fig. 3.—Plomb arsenie, *Hauy.*—The prevailing colours are pale-yellow and green. It occurs massive, in granular concretions, in small acicular six-sided prisms, or in very delicate capillary silky fibres, which are transparent, slightly flexible, and easily frangible. The specific gravity is 5·0, 6·4. Its constituent parts are, oxide of lead 69·76, arsenic acid 26·4, muriatic acid 1·58.—*Gregor.* It is found in the mine of Huel Unity, in Cornwall; also at St. Prix, in France. *Reniform Arseniate of Lead* is of a reddish-brown colour, and has hitherto been found only in Siberia. *Earthy Arseniate of Lead* has a yellow colour, and occurs in crusts along with filamentous arseniate of lead, at St. Prix.

Sp. 6. Chromate of Lead. Pl. XL. fig. 4.—Roth Bleierz,

Werner; Plomb chromate, *Hauy*; Prismatic Lead-Spar, or Red Lead-Spar, *Jameson.*—Its colour is hyacinth-red. It seldom occurs massive, generally in flakes; and crystalized in many varieties of form, of which the primitive is an oblique four-sided prism, fig. *i.* The lateral planes of the crystals are longitudinally streaked, the other planes smooth, shining, or splendent, and the lustre adamantine. The structure is distinctly lamellar; the fracture is small-grained, uneven. It is more or less translucent, and gives a pale orange-yellow streak. It is almost sectile, and easily frangible. The specific gravity is 5·7 to 6. Before the blow-pipe it tinges borax green, and on charcoal it is reduced to the metallic state. It does not effervesce with acids. It consists of, oxide of lead 63·96, chromic acid 36·40.—*Vauquelin.* Chromate of lead is found in veins, in gneiss, at Beresofsk, in Siberia. In Russia, a pigment is prepared from it of a very beautiful orange-yellow colour.

Sp. 7. Sulphate of Lead.—Vitrol Bleirz, *Werner*; Plomb Sulphaté, *Hauy.*—The colours are yellowish and greyish-white. It occurs massive, disseminated, and crystalized, in oblique four-sided prisms, and broad rectangular four-sided pyramids. The crystals are small; externally splendent; internally shining, and the lustre adamantine. The cross fracture is conchoidal; it varies from transparent to translucent; it is brittle, and yields to the nail. Before the blow-pipe it melts, and is soon reduced to the metallic state. It consists of 70·50 oxide of lead, 25·75 sulphuric acid, 2·25 water.—*Klaproth.* Sulphate of lead is found at Pary's mine in Anglesey, and Penzance, in Cornwall; at Wanlockhead and Lead-hills, in Scotland.

The physical characters of lead in its metallic state are universally known. It has a blueish-white colour, and, when recently melted or cut, exhibits considerable lustre, which it looses when exposed for some time to the air. It is nearly insipid, and, like copper, emits, when rubbed, a peculiar unpleasant odour. It stains the fingers, and paper, of a blueish colour, and its specific gravity is 11·35. It is very soft and flexible, and, though it has little tenacity, it is very malleable, and may be beaten into thin leaves and drawn into wire. It melts at about 610° of Fahrenheit,

and is capable of uniting with at least three proportions of oxygen, forming three distinct oxides. At a high temperature, it absorbs oxygen very rapidly, and, when fused in open vessels, a grey film forms upon its surface, which is a *protoxide of lead.* By continuing the heat, the protoxide assumes a uniform yellow colour; it may also be formed by exposing the carbonate of lead to a red heat, or it may be precipitated from a solution of the nitrate, by potash, of a whitish colour, and in a state of purity. It is well known in commerce by the name of *massicot,* and when exposed to a strong heat it is partially melted into a semi-transparent glass, which is called *litharge.* It is insoluble in water, but is dissolved by the alkalies, and constitutes the basis of the salts of lead. The deutoxide is obtained by exposing the protoxide, or massicot, to heat, with a large surface, and free access of air. It is then converted into the well-known pigment, *red lead,* or *minium.* At a red heat it gives off this second dose of oxygen, and returns to the state of protoxide. When digested in nitric acid it is decomposed; the greater part is reduced to the state of protoxide, which is dissolved by the acid, while the other portion combines with the excess of oxygen and is converted into a peroxide. It is of a dark brown colour, and, when strongly heated, it gives off three or four per cent. of oxygen gas. The oxides of lead are easily vitrified, and have the property of combining with all the metals except gold, silver, and platina. Gold and silver may thus be purified by melting them with lead; the process is called *cupellation.* The metal to be purified is wrapt up in a sheet of lead, and laid upon a crucible made of some very porous substance; they melt together, the lead becomes first oxidated, then vitrified, and sinks into the *cupel,* carrying along with it all the baser metals, and leaving the gold or silver upon its surface. Lead also combines with chlorine, iodine, sulphur, and phosphorus, and with several of the metals.

Lead, in its pure metallic state, does not appear to exert any deleterious influence on the animal system; but when oxidized, or in combination with acids, it acts as a powerful poison. It is probable that all the preparations of lead are poisonous, when administered internally, or when applied externally for a length of

time to the surface of the body. "Even those places which are near lead mines, are by no means healthy, though they are not exposed to any of the fumes arising from the furnaces; and it has also been proved that people sitting in a room adjoining one that has recently been oil-painted, are often affected with the usual symptoms which lead produces when it has been taken into the system, although they have not come directly in contact with it, or any of its preparations. These facts seem to prove the accuracy of the opinion, that a poisonous emanation arises from lead, or its compounds, though we are totally ignorant in what it consists. The most probable opinion is, that the lead or its compounds exist in a state of minute division in the atmosphere, but are not held in solution by any chemical agency. Lead itself is perfectly insoble in water, but is soon oxidated and converted into a carbonate by aerated water, (water containing free carbonic acid); in this state, however, it is likewise insoluble in water, but is often mechanically suspended while in a state of minute division,* and is in this manner introduced into the system. The carbonate has been detected in water conveyed through leaden pipes for culinary purposes, and in a ship where the water was kept in leaden vessels, all the crew were soon affected with cholic. These circumstances shew the impropriety of allowing water to stand for any length of time in leaden cisterns, especially if they be exposed to air; but if the water contain any acidulous substance, the oxidation and solution, or diffusion of the lead in the water, will proceed much more rapidly; thus, vinegar oxidates and dissolves lead, forming an acetate of lead, which is a soluble salt, and it is owing to its presence that wines act so readily on this metal. Any saline impregnation also seems to favour its oxidation."†

The effects of the preparations of lead on the animal economy vary with the rapidity with which it enters the system. In large doses the soluble salts of lead act as powerful irritant poisons, causing inflammation of the stomach and alimentary canal. When introduced slowly into the system, the intestines are first affected, obstinate constipation from diminished action takes place, accom-

* Brande's *Journal*, vol. xiv. p 240.

† Reid's *Academical Examinations*, vol. ii. p. 39.

panied frequently with severe and almost constant pain about the navel, giving rise to what is named *Colica pictonum*. The stomach is generally more or less disordered, the appetite is impaired, and there is sometimes, though not constantly, vomiting. The skin has a dull, dirty, cadaverous appearance, and is often bedewed with a cold clammy perspiration. The pulse is sometimes retarded, but more commonly small and quick; the respiration is laborious; tremors and debility of the voluntary muscles succeed, and are often followed by partial paralysis, and in violent cases by apoplexy.

The best antidote to the soluble salts of lead, is a solution of the sulphates of soda or of potash, as it immediately decomposes them, producing an insoluble sulphate of lead, which is comparatively inert. In the treatment of the colica pictonum, the principal object is to allay the spasm, and to evacuate the bowels by mild cathartics, particularly of sulphate of magnesia, or castor oil, combined with opium. The plan of treatment usually adopted in Edinburgh consists in giving a large dose of some neutral laxative salt, and, an hour afterwards, a full dose of opium. "Sometimes," says Professor Christison, "alvine discharges take place before the opium acts, more commonly not till its action is past, and occasionally not for a considerable time afterwards. But the pain and vomiting subside, the restlessness and irritability pass away, and the bowels return nearly or entirely to their natural condition. Sometimes it is necessary to repeat the practice. It is almost always successful. I have never seen the second dose fail to remove cholic, leaving the bowels at worst in a state of constipation. When the pulse is full and strong, I have seen venesection premised with apparent advantage." Where all fluids are rejected by vomiting, a pill of calomel, colocynth, and opium, may be given, and a return of the disease is to be guarded against by the constant use of some aperient medicine.

Sulphuretted hydrogen, added to liquids containing lead, gives a blackish precipitate, but a similar effect is produced when iron, silver, and some other metals are present; hence it cannot be relied on as a test for discovering lead. The subcarbonate of ammonia will precipitate lead from its solutions in the form of a

white carbonate, and chromate of potash will throw down a beautiful orange-yellow powder. When the presence of any of the oxides or salts of this metal are suspected in a dry substance, it may be reduced to a metallic state by subjecting it to the action of heat by means of a blow-pipe upon charcoal. For an account of several ingenious processes for discovering the presence of this metal in mixed fluids, the reader may consult Dr. Christison's valuable "Treatise on Poisons."

The officinal preparations of lead are the semi-vitrified oxide, the red oxide or minium, the white oxide or sub-carbonate, and the acetate and sub-acetate.

Oxides of Lead.

Semi-vitrified Oxide of Lead, or Litharge. *Plumbi oxidum semi-vitreum,* L.E.D.—This is a protoxide of lead in the form of semi-transparent scales, of a reddish-yellow colour. It is usually obtained during the calcination of lead, when separating the silver with which the metal is often combined. The lead is placed in a wind furnace, on a large dish, or cupel, exposed to a strong heat, with a current of air from a large pair of bellows directed upon its surface. It is used only in some pharmaceutical preparations, particularly for forming, when boiled with oil, a plaster, (*Emp. plumbi,* Ph.) which has been long known under the name of *Diachylon,* and is used as a common application in excoriation of the skin, as a dressing to wounds, and for forming the basis of other compound plasters.

Red Oxide of Lead. *Oxidum plumbi rubrum,* Ph. E.—*Minium,* the *deutoxide of lead,* or *red lead,* is obtained by exposing the yellow oxide to heat and atmospheric air in a reverberatory furnace, until it acquires a bright red colour. It is in the form of a very heavy scaly powder, its specific gravity being 8·94. It is sometimes applied to the same purposes as litharge, and is used in considerable quantities as a flux.

Subcarbonate of Lead. *Plumbi subcarbonas,* Ph. L.—This preparation, well known by the name of *Cerusse,* or *white lead,* is prepared by suspending thin sheets of lead in the vapours of

vinegar: the vinegar acts chemically on the lead, a white crust is formed on its surface, which, when it has accumulated sufficiently, is scraped off, and reduced to a fine powder by levigation. According to Mr. Brande, it consists of one proportional of oxide of lead=112, and one of carbonic acid=22, and is, therefore, a *carbonate* of lead. It is never given internally, but it forms the basis of an ointment, (*Ung. Cerussæ*, Ph. D.) which is principally used as an application to burns and superficial inflammation. It is sometimes applied in fine powder to the excoriated cuticle of infants, a practice, however, which appears not to be altogether without danger, and is now very generally exploded.

Salts of Lead.

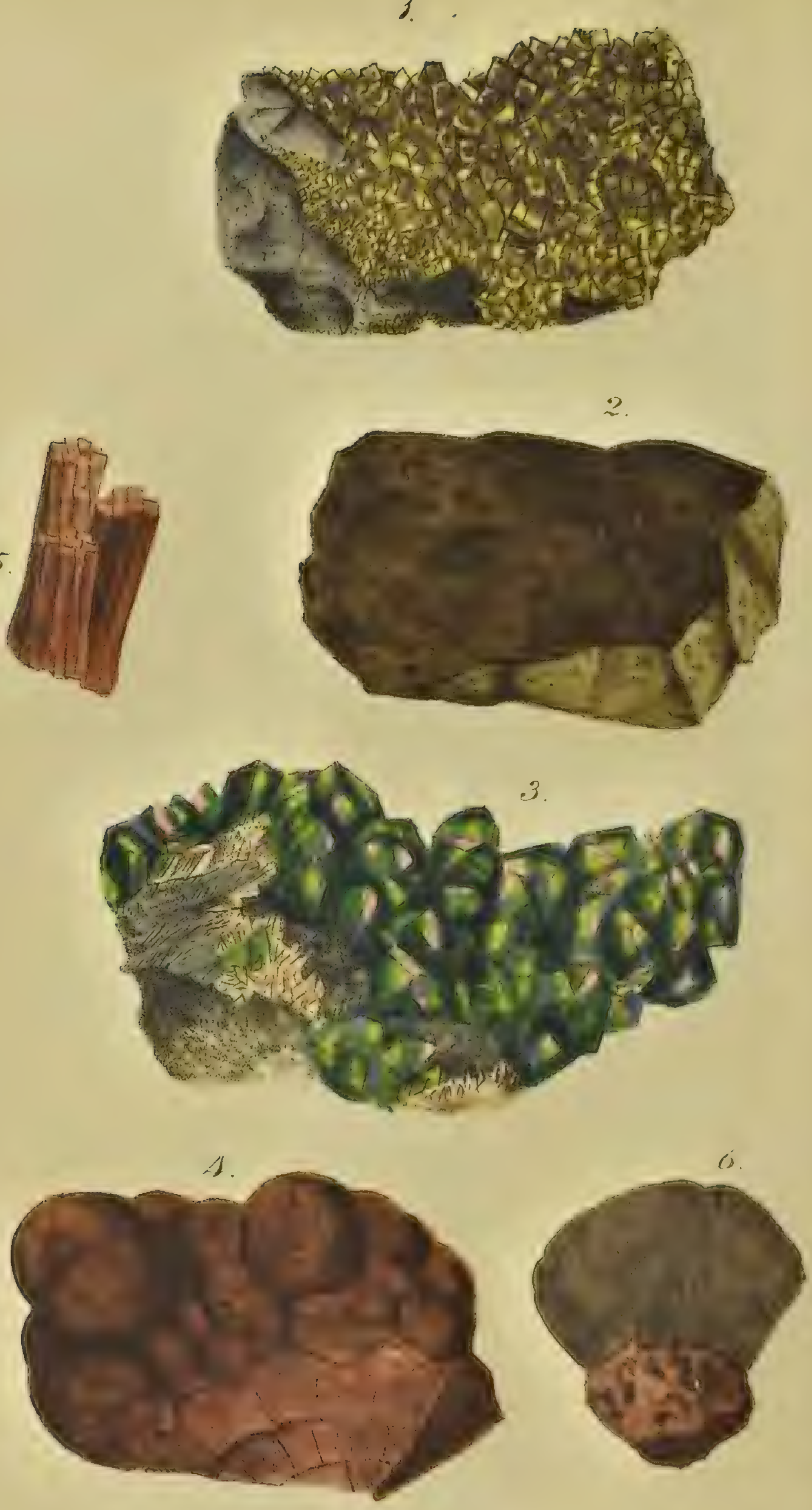
Acetate of Lead. *Plumbi Acetas.*—This salt is prepared by boiling the carbonate of lead in distilled vinegar, until the acid acquire a sweet taste, and evaporating the liquid, which, on cooling, affords crystals. It is prepared on a large scale for the use of the calico-printers, and is known in commerce under the name of *sugar of lead*. When pure it is inodorous, and has a sweet astringent taste: it crystalizes in flat, shining, acicular, four-sided prisms, with dihedral summits, which are generally aggregated in irregular masses, that have the appearance of lumps of sugar. Its specific gravity is 2·345. It is soluble in about three and a half times its weight of distilled water; and is also soluble in alcohol. It is decomposed by hard water, by the alkalies, by most of the acids and neutral salts, lime, magnesia, and all the sulphurets. According to Berzelius, the constituents of 100 parts are 58·71 of oxide of zinc, 26·96 of acid, and 14·32 of water.

From its astringent and sedative effects, acetate of lead has been long employed as an external application to inflamed and excoriated parts. " It has also acquired considerable celebrity as an internal remedy, requiring, however, considerable caution in its exhibition. Its principal use is in *urgent* cases of internal hæmorrhage, as of the lungs, stomach, or uterus; and in consequence of the violently spasmodic action of the bowels, which it is apt to induce, it requires generally to be given with opium, and

often with some mild aperient. Paralytic affections occasionally follow its administration, where due precaution in regard to the state of the bowels is not taken. In hæmoptysis, where the quantity of blood coughed up is considerable, or where the usual remedies, especially nitre and dilute sulphuric acid fail, acetate of lead may be given, (in combination with opium or digitalis,) care being taken to avoid in the medicines and drinks those acids which decompose it, and especially the sulphuric, by which it appears, from Orfila's experiments, it is rendered nearly, if not quite, inert; hence it is that sulphate of soda is an effective antidote where any of the soluble salts of lead have been swallowed. In hæmatemesis the same remedies may be had recourse to; also in menorrhagia; but in all these cases, the necessity of active measures for subduing febrile symptoms, where the inflammatory diathesis prevails, must not be lost sight of; nor should the patient be, in any case, suffered to continue the use of the acetate for any length of time. When solutions of acetate of lead are used externally, the salt should be dissolved in distilled water, and all substances tending to decompose it should be carefully avoided. The addition of a little acetic acid to these lotions prevents the deposition in them of carbonate of lead; and where they are used in collyria, such deposition is sometimes mischievous; they are employed in ophthalmia, and generally as astringents and sedatives in all cases of superficial inflammation. For collyria, the proportion of acetate of lead may be about ten grains, and for lotions about thirty grains, to eight ounces of rose or elder flower water, and two or three drachms of distilled vinegar may be added."* When given internally, its dose is half a grain, repeated every five or six hours.

SOLUTION OF SUBCARBONATE OF LEAD. *Liquor plumbi subacetatis*, Ph. L.—This solution, formerly named *Goulard's Extract*, is made by boiling litharge, or semi-vitrified oxide of lead on distilled vinegar. It is the *Aqua Lythargyri Acetati* of the old nomenclature. When properly prepared, it is of a pale yellowish-green colour, has a slight acetous odour, and a sweetish styptic taste. It is decomposed by the soluble carbonates, sulphates, and

* Brande's *Manual of Pharmacy*, p. 309.



1, Iron Pyrites.

2, Magnetic Iron Ore.

3, Iron Glance.

4 & 5, Red Iron Ore.

6. Brown Iron Ore.

d by G.F. Madeley 3 Wellington St Strand

London. Pub. by John Wilson. Princes St. Oct. 1. 1831

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muriates, by mucilage, gum, and by the greater number of soluble vegetable principles. This solution is limited to its external application; when properly diluted with distilled water, in the proportion of ʒi or ʒii to the ounce of water, it forms a very valuable astringent and sedative lotion, in some cutaneous eruptions, burns, excoriations, phlegmons, and in almost all cases of external inflammation.

Genus IX.—IRON.

Fer, Fr.; *Ferro*, It.; *Hierro*, Sp.; *Eissen*, Ger.; *Hedeed*, Arab.; *Loha*, Hind., Sans.; *Tee*, Chin.

No metal occurs more universally diffused than iron; it enters into the composition of a great variety of mineral substances, and even entire mountains are formed of iron ore. It is found in almost every part of the globe, either in veins or associated with the ores of other metals. Its ores are very numerous; the following are the most important.

Sp. 1. Native Iron.—This species is divided into two sub-species, viz. Terrestrial Native Iron, and Meteoric Native Iron. *Terrestrial Native Iron* is of a steel-grey colour. It occurs massive, in plates, and in leaves. Internally, it is glistening with a metallic lustre. It contains, iron 92·50, lead 6, copper 1·50.—*Klaproth*. It is found in Saxony. *Meteoric Native Iron* is of a pale steel-grey colour. It occurs ramose, globular, and disseminated in meteoric stones. It contains, iron 96, nickel 3·5. This sub-species falls from the air in various parts of the world.

Sp. 2. Iron Pyrites, or Sulphuret of Iron. Pl. XLI. fig. 1.—Gemeiner Schwefelkies, *Werner*; Fer sulphure, *Hauy*.—Its colour is brass-yellow. It occurs massive, disseminated, globular, and crystalized, in cubes and octahedrons, variously modified. Internally, it is shining and glistening, and the lustre is metallic. The specific gravity is from 4·6 to 4·8. It is very hard, and even gives sparks, with steel. Before the blow-pipe it emits a sul-

phureous odour, and melts into a brownish-coloured globule. It contains, iron 47·85, sulphur 52·15,—*Hatchett*. It is extremely common, but is never worked as an ore of iron. It is principally valued on account of the sulphur which can be obtained from it by sublimation, and the sulphate of iron which it affords by exposure to the air.

Sp. 3. Magnetic Iron Ore. Pl. XLI. fig. 2.—Gemeiner Magneteisenstein, *Werner*; Fer Oxydulé, *Werner*—Its colour is iron-black, with a shining or splendent metallic lustre. It occurs massive, lamelliform, earthy, and crystalized, in octahedrons and rhomboidal dedecahedrons. Its fracture is uneven or conchoidal. Its specific gravity is 4·4. Before the blow-pipe it becomes brown, but does not melt. It consists, according to Berzelius, of 24·14 protoxide of iron, and 71·86 of iron. The massive variety forms the well-known magnet, or loadstone, and possesses the highest degree of magnetic polarity. Magnetic iron ore occurs principally in beds, in primitive mountains in Norway, Sweden, Lapland, and other countries. When pure, it affords excellent iron.

*Sp.*4. Iron Glance, or Specular Iron-Ore. Pl. XLI. fig. 3. —Eissenglanz, *Werner*; Fer Oligiste, *Hauy*.—The colour is steel-grey, which sometimes passes into iron-black, with a brilliant, and frequently iridiscent tarnish externally. It occurs massive, disseminated, and crystalized, in plates and in minute shining scales. When it occurs in small plates or scales, it is called *Micaceous Iron Ore*. The primitive form is an acute rhomboid. It is opaque, except in thin fragments, which on the edges are of a blood-red colour by transmitted light. The lustre is metallic, and frequently highly splendent. Its fracture is uneven, passing into conchoidal. The specific gravity is about 5. It is a peroxide of iron, containing, according to Berzelius, a small portion of titanium. It generally occurs in beds, in primitive and secondary rocks, in Cornwall, and in many mines on the continents of Europe, Asia, and America. It is found in great abundance in Sweden, where it is manufactured into the best bar iron. The most beautiful specimens of crystalized iron-glance are brought from the island of Elba.

Sp. 5. RED IRON ORE. PL. XLI. fig. 4·5.—Rother Eisenstein, *Werner*.—The principal varieties of this ore are, compact red iron-ore, fibrous red iron-ore, scaly red iron-ore, and ochry red iron-ore. The *Compact Red Iron-Ore* occurs most commonly massive, sometimes disseminated, specular, with impressions, and in suppositious crystals. Its colour is between dark steel-grey and blood-red. Its fracture is uneven; and the lustre is shining or glimmering. It yields to the knife. According to Bucholz, it contains, oxide of iron 70·5, oxygen 29·5=100. *Fibrous Red Iron-Ore,* or *Red Hematite,* occurs with the preceding, in globular, tuberose, or reniform masses, also cylindrical, corraloidal, and in distinct concretions. Its colour is brownish-red; the lustre is intermediate between pearly and resinous. The structure is fibrous in one direction, and curvedly lamellar in the other. *Scaly Red Iron-Ore* occurs in loose scaly particles of a reddish-brown colour, which feel unctuous to the touch, and stain the fingers. In England, all these varieties are found at Ulverston, in Lancashire; and afford excellent malleable and cast-iron.

Sp. 6. BROWN IRON-ORE. PL. XLI. fig. 6.—Braun Eisenstein, *Werner;* Prismatisches Eisen-erz, *Mohs.*—This ore occurs compact, fibrous, scaly, earthy, and also crystalized. It differs from the preceding species in the colour of its powder, which is of a blackish-brown colour. It is found in beds, or masses, sometimes of great magnitude; and affords excellent bar-iron.

Sp. 7. CLAY IRON-STONE.—Thoneisentein, *Werner*; Fer oxidé massif and geodique, *Hauy.*—The prevailing colours are ash-grey and reddish-brown. It occurs massive, globular, and in kidney-shaped masses or nodules. It is dull, earthy, and yields easily to the knife. The fracture is even, or flat conchoidal, and the structure is sometimes slaty. Its specific gravity is about 3·5. It becomes black and highly magnetic before the blow-pipe. That of Colebrookdale contained, oxide of iron 50, oxide of manganese 2·6, silex 10·6, alumine 2, lime 1·6, magnesia 2·4, water and carbonic acid 32. Clay iron-stone occurs abundantly in thin strata, which, alternate with bituminous shale, sandstone, and coal, in the independent coal formations; and it is the ore from which English iron is principally obtained.

Sp. 8. Sparry Iron-Stone. Pl. XLII. fig. 2.—Spath Eithenstein, *Werner*; Fer oxydé carbonate, *Hauy*.—Its colours are yellowish-white, or brown. It occurs massive, and crystalized, in a great variety of forms. It is translucent or opaque, and the lustre is shining or pearly. The structure is lamellar; it yields easily to the knife; it effervesces in muriatic acid. Before the blow-pipe it becomes magnetic, but does not melt. The specific gravity varies from 3·6 to 3·8. A specimen, analysed by Bayen, yielded, oxide of iron 66, carbonic acid 34. In Germany it is smelted as an ore of iron.

Sp. 9. Blue Iron-Ore. Pl. XLII. fig. 3.—Fer phosphaté, *Hauy*.—The colour is indigo-blue, smalt-blue or greenish-blue. It occurs crystalized in small translucent prisms, with dihedral summits. It also occurs massive, earthy, and opaque. The crystalized variety contains, phosphate of iron 41·25, phosphoric acid 19.25, water 31·25, alumine 5, ferruginous silex 1·25.

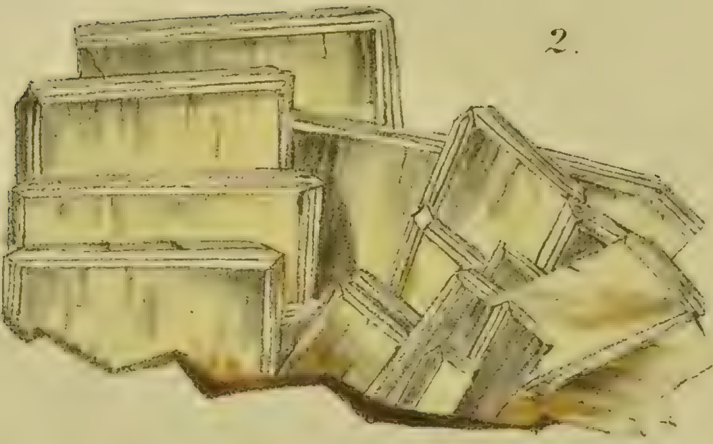
Sp. 10. Chromate of Iron. Pl. XLII. fig. 4.—Chromeinstein, *Werner*; Fer chromaté, *Hauy*.—The colour is brownish-black. It occurs massive, disseminated, and in granular distinct concretions; also crystalized in oblique four-sided prisms. The fracture is fine-grained, uneven. Internally, it is shining or glistening, and the lustre imperfect metallic. It scratches glass. It is infusible before the blow-pipe, but yields a bright green colour with borax. In England it occurs in serpentine and talc, in the Shetland islands, and is employed to obtain the chromic acid, which forms a beautiful yellow pigment, with lead.

Sp. 11. Arseniate of Iron. Pl. XLII. fig. 5.—Wurfelerz, *Werner*; Fer arseniaté, *Hauy*; Cube Ore, *Jameson*.—Its colour is green. It occurs massive and crystalized, in small translucent cubes. The crystals are aggregated, smooth, and splendent. Internally, they are glistening, and the lustre is intermediate between vitreous and resinous. It is rather brittle, and easily frangible. Before the blow-pipe it melts, and gives out arsenical vapours. Arseniate of iron contains, oxide of iron 46, arsenic acid 18, water 32.—*Vauquelin*. It is found in Cornwall.

In Sweden and the north of Europe the supply of iron is chiefly derived from the species named magnetic iron ore; but in this

1.

2.



3.

1. Calcareous Spar. double refracting.

2. Sulphate of Barytes. *3. Aluminous Schistus.*

Printed by G.E. Madeley 3 Wellington

Pub by John Wilson Princes Street Nov.1. 1831

1. Reniform Clay Ironstone. 3. Blue Iron Ore, or Phosphate of Iron.
2. Sparry Ironstone. 4. Chromate of Iron.
5. Arseniate of Iron.

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country is principally extracted from clay iron stone. The ore, broken into small pieces, is first roasted, to drive off any extraneous volatile matter, and then exposed to a strong heat in a blast furnace, along with limestone and coke. The lime, which is used as a flux, combines with the earthy ingredients, (alumina and slica,) and promotes their vitrification, while the carbon of the coke unites with the oxygen of the oxide, leaving the metallic iron in a liquid state, which is then allowed to run into large ingots, called *pigs*, in sand moulds, and forms what is called crude, or *cast iron.* In this state, however, it is not perfectly pure, and requires to be again fused with charcoal, urged by the blow of a large pair of bellows. When it assumes the consistence of paste, it is pressed between steel rollers, which force out the remaining impurities, as they retain the liquid form longer than the pure iron. The same effect is produced by striking it with a forge hammer: in this state it is called *malleable, forged*, or *bar iron.*

Purified or bar iron has a grey or blackish-white colour; it is very malleable and ductile, and is susceptible of a very high polish. Its specific gravity is about 7·8. It is one of the most infusible of the metals, but at a temperature considerably below its melting point it becomes soft, and possesses the property of welding to great perfection. It is attracted by the magnet, and capable of having the magnetic virtue imparted to it. The affinity of iron for oxygen is very great: it is soon tarnished and oxidized when exposed to the air, particularly if it be moist. It burns with great splendour in oxygen gas, and when heated to redness in the open air, it absorbs oxygen rapidly, and is converted superficially into black scales; these scales are separated by percussion, and form what is commonly called the *black oxide* of iron.

Iron has been long used medicinally, and appears to be the only metal having any sensible activity, which is not noxious to the animal system. When administered internally, its effects are those of a powerful tonic; it increases the force of the circulation, gives the blood, it has been affirmed, a more florid hue, promotes digestion, excites the healthy secretions, or restrains them when they have been morbidly increased; it imparts a degree of energy to

the muscular fibre, and, by its astringency, checks profuse evacuations, and counteracts the tendency to hæmorrhage. The cases best adapted for its exhibition are those of debility, or where the strength of the constitution has been impaired either by long continued mental anxiety, excessive study, or bodily exertion beyond the strength, and generally in convalescence after various diseases. The morbid affections in which iron is principally prescribed, are dyspepsia, hypochondriasis, hysteria, rickets, scrofula, chlorosis, fluor albus, gleet, passive hæmorrhagies, palsy, and the latter stages of pulmonary consumption. The preparations of iron, in very large doses, have been employed with signal advantage in some obstinate nervous and spasmodic affections, more particularly in chorea and *tic doloreux*. Dr. Bree recommends it in certain stages of asthma, as a means of lengthening the paroxysms, and it has been also proposed as a remedy for cancer. In general, iron is most advantageously taken given in small doses, regularly administered, and continued for some time; hence, says Dr. Murray, arises the greater benefit derived from chalybeate mineral waters, than from iron in any other form. Chalybeates are contra-indicated in all cases where there is a tendency to inflammatory action, or a plethoric state of the vessels; and its administration ought to be suspended, where it renders the pulse quick, or where thirst and a white tongue are associated with flushings, and increased determination of blood to the head.

The medicinal preparations of this metal are numerous; the most useful and certain are the protoxide, or proto-carbonate, as it exists in the *mistura ferri composita* of the pharmacopœia, the muriated tincture, the sulphate, and the subcarbonate or iron.

Iron Filings, (*Ferri ramenta*, Ph. L.; *Limatura ferri*, E.) purified by the magnet, have occasionally been prescribed internally as a tonic and anthelmintic, in a dose of from grs. x. to ℨss. It is the least active form in which iron can be given, and exerts no action on the system unless it meets with acid in the stomach, by which the metal may become oxidized. Its operation is determined by the disagreeable eructations of hydrogen gas, which it produces, and by the black colour of the alvine evacuations.

Oxides of Iron.

PROTOXIDE, OR BLACK OXIDE OF IRON. *Ferri Squamæ Oxidi*, Ph. D.—This oxide is the scales of iron detached by the hammer of the smith from the surface of the iron when it is red hot. It is attracted by the magnet, and when freed from impurities in this way, constitutes the "*Oxidum ferri nigri purificati,*" of the Edinburgh pharmacopœia. It is used only in making the "*Tinctura muriatis ferri.*"

PEROXIDE, OR RED OXIDE OF IRON. *Oxidum ferri rubrum*, E. D—This oxide is formed by exposing the black oxide to air at a high temperature, or, as directed in the pharmacopœias, by calcining the dried sulphate of iron at an intense heat, until it becomes of a deep red colour. It was formerly named *Colcothar*, or *caput mortuum vitrioli,* and is employed by the Edinburgh and Dublin colleges in making the "*Murias Ammoniæ et ferri.*"

SUB-CARBONATE, OR RUST OF IRON. *Ferri Subcarbonas*, Ph. L.; *Rubigo Ferri.*—This is a peroxide of iron, containing a very small proportion of carbonic acid. It is prepared by exposing filings of iron wire, cut in small pieces, to air, and then frequently moistening them with water, till they are converted into rust. By this process, the metal is oxidated at the expence of the water, which is decomposed, while, at the same time, carbonic acid is absorbed from the atmosphere and combined with the oxide.

The *Carbonas ferri precipitatus*, of the Edinburgh College, is prepared by adding a solution of carbonate of soda to a solution of sulphate of iron. It is also a sub-carbonate, and agrees in its medicinal properties with the rust. The rust of iron is a useful tonic and emenagogne, and may be administered in all cases where chalybeates are indicated. It is inodorous, insipid, and insoluble in water; hence it is commonly given in the form of pills, combined with bitters and aromatics, or with aloetics, valerian, and myrrh. Its usual dose is from five grs. to ʒi. As a remedy in tic doloreux, it is given in the dose of from half a drachm to a drachm. In chorea, this preparation of iron has been administered with great success in doses of two drachms twice or three times a-day.

Salts of Iron.

Sulphate of Iron. *Ferri sulphas.*—This salt is prepared by dissolving iron in dilute sulphuric acid, and evaporating the solution; the water is decomposed, its oxygen, the iron, and the acid unite, and hydrogen gas is disengaged. It is prepared, for the various purposes to which it is applied in the arts on a large scale, from the sulphuretted ores of iron, by exposing them to air and moisture, till a crust of sulphate of iron is formed on their surface, which is afterwards obtained in crystals, by solution and evaporation. Sulphate of iron is known in commerce by the name of *green vitriol, salt of steel* or *copperas,* and is obtained in rhomboidal prisms of a green colour, a strong styptic taste, and soluble in about their weight of water at 60°. It is one of the most active preparations of the metal, and is frequently prescribed with advantage, combined with the cinchona bark, in scrofulous affections, and in amenorrhœa, with bitter extracts, or with myrrh. It is given in the form of pills, conjoined with aromatics, to prevent its griping. Its medium dose is from one to three grains. Externally, it has been used as a lotion to cancerous sores and ill-conditioned ulcers.

Tartarized Iron. *Ferrum tartarizatum.*—It is obtained by triturating iron filings and super-tartrate of potass with water, exposing the mixture to the action of the air and moisture for twenty days, then boiling it in distilled water, and evaporating the filtered solution to dryness. The tartarized iron forms a powder of a brownish-green colour; it is very soluble in water, and attracts moisture from the atmosphere, so as to become moist, but does not deliquesce. It has been employed as a chalybeate in a dose of from grs. x. to ʒss., given either in the state of solution or in the form of pills. It is a very mild preparation, and, as it is nearly tasteless, proves a convenient form for the administration of iron to children. It has been erroneously supposed to possess a diuretic power; hence it has been extolled as a remedy in dropsy.

Ammoniated Iron. *Ferrum ammoniatum,* Ph. L.—To prepare this saline compound, equal parts of the muriate of ammonia and red oxide of iron are put into a crucible, and subjected to sublimation.

The ammoniated iron was formerly known under the names *flores martiales, ens martis, flores auri,* and *calendulæ minerales.* It has been highly extolled as a remedy in epilepsy, hysteria, scrofula, chlorosis, and rickets; but on account of the uncertainty of the preparation, it is never prescribed, as Mr. Brande justly observes, "by those physicians who are acquainted with the chemical properties of the remedies which they exhibit. It may be administered in pills, in electuary, or in solution ; but the *tinctura ferri muriatis* is, in all cases, a proper substitute, to which muriate of ammonia is easily added by those who attribute any additional efficacy to the combination." The dose is from six to ten grains, given three or four times a-day.

Muriate of Iron.—This salt, employed under the form of tincture, (*Tinctura ferri muriatis,*) is prepared by digesting half a pound of the subcarbonate of iron, for three days, in a pint of muriatic acid, and diluting the solution with three pints of alcohol. It is one of the most active preparations of iron, and is given in doses of from ten to fifteen drops, twice a-day, largely diluted with water. Internally, it has been employed principally as a tonic, particularly in scrofulous affections, and in the diseases in which chalybeates are usually prescribed; but a very important use has been attributed to it by Mr. Cline, who strongly recommends it in suppression of urine, from spasmodic stricture in the urethra, ten drops being given every ten minutes, until nausea is produced. It has also been beneficially employed as a styptic, in internal hæmorrhages. Externally, it has been used as an application in ill-conditioned ulcers, and also to destroy venereal and other warts.

Genus X.—MANGANESE.

Manganese, Fr.; *Manganese,* It. Sp.; *Brannstein,* Ger.

The ores of this mineral are few; it is never found in the metallic state, but generally occurs combined with oxygen; more rarely with sulphur, or with acids. The ores of manganese may generally

be distinguished by the property of imparting a purple or violet colour to borax.

Sp. 1. Grey Manganese, or Oxide of Manganese. Pl. XLIII. fig. 1.—Graun braunsteinerz, *Werner*; Manganese oxidé metalloide, *Hauy*.—It is of a dark steel-grey colour, inclining more or less to iron-black. It occurs in a great variety of forms, either regularly crystalized, or acicular, also massive, dendritical, and in fibrous and radiated concretions. The lustre is shining or glimmering, and metallic; the fracture conchoidal and earthy. The massive varieties have either a granular, a laminar, or a fibrous structure, or they are compact, and their texture earthy and dull. It is soft, brittle, (except the compact variety,) and soils strongly when rubbed, giving a black streak. It is infusible before the blow-pipe, and tinges borax purple. The specific gravity varies from 3·5 to 4·7. One hundred parts of the crystalized variety yielded, oxide of manganese 90·5, oxygen 2·25, water 7; the compact afforded, oxide of manganese 60, silex 25, water 13.—*Klaproth*. This ore is found in most of the countries of Europe, frequently in iron mines. It occurs in veins and imbedded masses, both in primitive and secondary rocks, near Upton Pyne, in Devonshire, in various places in Cornwall, and near Aberdeen, in Scotland. In Ireland it occurs with brown iron ore, at Howth, near Dublin.

Grey manganese ore is used in large quantities in the preparation of chlorine in the manufactory of chloride of lime (common bleaching powder); it is also used by glass-makers to destroy the brown tint which that material receives from the admixture of inflammable substances. It is admitted into the list of materia medica, as the cheapest and most convenient substance from which to procure oxygen gas. For this purpose a quantity of the ore reduced to a coarse powder, is exposed to a red heat in an iron retort, the beak of which is introduced under a large jar filled with water, inverted and placed on the shelf of the pneumatic trough. It may also be obtained by exposing the ore to a gentle heat in a glass retort, with half its weight of strong sulphuric acid. Oxygen gas, when respired, acts as a stimulant; it increases the force and velocity of the pulse, and has been employed as a remedy in asphyxia, chlorosis, asthma, dropsies, paralysis, and some other

1. Grey Manganese Ore. 2 Arsenical Pyrites.
3. Red Sulphuret of Arsenic.
4. Yellow Sulphuret of Arsenic. 5. Arsenical Cobalt.

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diseases, but without producing those beneficial effects which might, *a priori,* have been expected from its administration. It is never exhibited in a pure state, but requires to be diluted with from ten to twenty parts of atmospheric air, increasing the proportion of oxygen according to the effects produced. From one to two quarts may be given, by breathing it, at intervals, from the gazometer, or from a silk bag, to which a tube with a stop cock is affixed. The use of the grey manganese ore in fumigations, for the purpose of destroying infection, will be mentioned in a subsequent part of the work.

Genus XI.—ARSENIC.

Arsenic, Fr.; *Arsenico*, It.; *Arsenico*, Sp.; *Arsenic*, Ger.

This metal occurs sometimes native and alloyed with other metals, but more commonly mineralized with sulphur or with oxygen. Combined with oxygen, it forms substances which have the properties of acids. The arsenic acid combines with various metals, and forms distinct species of ore, as the arseniates of lead, of copper, and of iron.

Sp. 1. Native Arsenic.—Gediegen arsenik, *Werner*; Arsenic natif, *Hauy*.—Its colour, when fresh broken, is tin-white, and the lustre glistening, sometimes shining, and metallic; but it soon becomes dark and nearly black by exposure to the air. It occurs amorphous, also disseminated, reniform, cellular, and in botryoidal or mamillated masses. Its fracture is small and fine-grained, uneven. It yields to the knife, and is easily frangible. Before the blow-pipe it burns with a white flame, diffuses an arsenical odour, and is entirely volatilized, except a minute portion of iron, gold, or silver, with which it is sometimes alloyed. Native Arsenic occurs with the ores of silver, copper, and cobalt, in various parts of Europe and America.

Sp. 2. Arsenical Pyrites.—Arsenikkies, *Werner*; Fer sulfuré arsenicale, *Hauy*.—Pl. XLIII. fig. 2.—Its colour is tin-white

passing into steel-grey. It occurs massive or disseminated, also in prismatic distinct concretions, and crystalized in oblique four-sided prisms, variously modified by bevelments and truncations. Externally it is shining or splendent; internally, shining or glistening, with a metallic lustre. The fracture is uneven. The specific gravity is 6·60. It gives fire with steel; when rubbed it emits an arsenical odour. Before the blow-pipe it gives out white arsenical vapours, leaving the oxide of iron, which is sometimes magnetic. According to Dr. Thompson, it contains, arsenic 48·1, iron 36·5, sulphur 15·4. Arsenical pyrites is very abundant in the copper and tin-mines in Cornwall; and it is from this ore that the white oxide of arsenic and artificial orpiment are principally prepared.

Sp. 3. Sulphuret of Arsenic.—Of this mineral there are two varieties, the red sulphuret of arsenic or realgar, and the yellow sulphuret of arsenic, or yellow orpiment.

Red Orpiment or *Ruby Sulphur*. Pl. XLIII. fig. 3.—Rothes Rauschgelb, *Werner*.—The colour is aurora-red, passing into scarlet or orange-red. It occurs massive, disseminated in flakes or membranes, and crystalized in oblique four-sided prisms, variously modified. It is soft, yielding to the nail; the fracture is uneven or conchoidal, and the lustre is resinous, inclining to adamantine. It is translucent or semi-transparent. The specific gravity is 3·30. Its constituent parts are, arsenic 69, sulphur 31=100. *Klaproth.* It is found in different mining districts in Germany; also in the fissures of lava in volcanic countries.

Yellow Orpiment. Pl. XLIII. fig. 4.—Gelbes Rauschgelb, *Werner*.—Its colour is lemon-yellow, with a brilliant lustre, intermediate between adamantine and semi-metallic. It occurs massive, disseminated, and in various external forms, and also crystalized. Its structure is laminar; it is sectile, flexible, but not elastic. It contains arsenic 62, sulphur 38=100. *Klaproth.* It occurs in veins in primitive and secondary rocks in various parts of the world. The orpiment of commerce is brought from the Levant.

Sp. 4. Oxide of Arsenic is said to occur in the Hartz, and in some other places on the Continent, crystalized in quadrangular prisms, also capillary, earthy, and stalactitic. It is of a snow-white

colour, and volatile, exhaling the odour of garlic. It is distinguished from *pharmacolite* (arseniate of lime) by its solubility in water.

Sp. 5. Arsenical Cobalt, or Cobalt Pyrites. Pl. XLIII. fig. 5.—This properly belongs to a distinct genus, and consists of oxide of arsenic combined with cobalt and sulphur. It is divided into three varieties, from its colour, viz. tin-white, silver-white, and grey cobalt. It occurs massive, in various particular forms, and its lustre is metallic. It is from this ore that the cobalt of commerce is principally obtained.

The term Arsenic is commonly applied to what has been ascertained to be an oxide of a peculiar metal; but in the language of chemistry it is appropriated to the metallic base of this compound alone. To obtain this metal the oxide mixed with half its weight of black flux, is exposed to heat in a crucible, another crucible being inverted over it and luted to it; the carbon of the black flux combines with the oxygen of the oxide, and forms carbonic acid, while the metal is sublimed, and condenses in a crystaline form in the upper crucible. *Metallic Arsenic* is of a blueish or steel-grey colour; it has considerable lustre, and is extremely brittle and pulverulent. It tarnishes quickly by exposure to the air, and becomes black. It is volatalized at 356° of Fahrenheit, in dense white fumes, which have a strong smell of garlic; at a higher temperature it burns with a blue flame. Metallic Arsenic exerts no action on the animal system, but when oxidized it is a very active poison.

White Oxide of Arsenic. *Arsenici Oxidum,* Ph. L., or *Arsenious Acid,* (called arsenic in the shops,) is principally brought from Bohemia and Saxony, where it is extracted in large quantities during the roasting of the ores of cobalt and arsenical pyrites. The ore is thrown into a furnace resembling a baker's oven, with a long flue, or horizontal chimney, into which the fumes pass, and are condensed into a greyish or blackish powder. This is refined by a second sublimation in close vessels, with a little potash to detain the impurities. The oxide of arsenic thus obtained is in the form of a dense white semi-transparent mass; sometimes it is opaque, pulverulent, or in the form of needles, in which state it was formerly called *flowers of arsenic.* It is inodorous, and its taste is gene-

rally described as acrid, sub-acrid, or sweetish ; but there is a great diversity of opinion among physicians with regard to its effects on the tongue and palate. Its specific gravity is about 3·7. When heated in the open air it is fused and volatalized, at a temperature of 380° of Fahrenheit, but no alliaceous odour is perceived unless it be partially decomposed ; the garlic smell belonging to it in its metallic state, and not to its oxide. According to Klaproth, it is soluble in 400 parts of water, at 60°, and in 13 parts of boiling water. It solution is said, by Dr. Ure, to redden the vegetable blues, though it turns the syrup of violets green. It is also sparingly soluble in oils and alcohol. Berzelius states, that 100 parts of the metal in this compound are united with about 31 parts of oxygen, and the experiments of Proust and Thomson seem to confirm this opinion. Arsenious acid combines with the various salifiable bases, (alkalies, earths, and metallic oxides,) forming salts, which are easily decomposed by heat and charcoal. The most important of these compounds is the *Arseniate of Potash.* It is formed by boiling 64 grains of arsenious acid, rubbed to a very fine powder, with as much sub-carbonate of potash, in a pint of distilled water, the boiling being continued till the solution is completed. When this is flavoured and coloured by adding four drachms of compound spirit of lavender, it forms the *Liquor,* or *Solutio Arsenicalis,* which has been used as a substitute for an empirical remedy called the tasteles ague drop. It is generally known under the name of Fowler's solution, but it appears now that it was known and published so far back as the year 1758. One ounce of the fluid contains four grains of white arsenic, and is administered in the cure of obstinate intermittents, periodical head-aches, chronic, cutaneous eruptions, and other diseases, in which arsenic has been given internally. The dose is from four to twelve or fifteen drops, conjoined with aromatics, three or four times a-day. It is decomposed by lime water, metallic salts, and the infusion of bark. Nitrate of silver, added to a solution of white oxide of arsenic, throws down a brick-red precipitate, lime water a white one, and the alkaline sulphurets a pale yellow precipitate.

Notwithstanding its activity as a poison, white arsenic has

been exhibited internally, in minute doses, in the treatment of various diseases; and externally, as an escharotic. Under proper management it will be found, next to cinchona bark, by far the most powerful of all medicines in the cure of intermittent fevers and periodic hemicrania, though its *modus operandi* has not been ascertained. It has also been employed in some obstinate cutaneous affections, particularly in lepra and elephantiasis; in certain forms or sequelæ of the venereal disease, which cannot be subdued by mercury; in some spasmodic complaints; in tetanus and chorea; in scirrhus and chronic rheumatism; and as an antidote to the poison of venomous serpents. It is best given in the form of the liquor arsenicalis already mentioned, and in the dose of four or five drops, gradually increased. No attempt should ever be made to administer it in substance; and if it excites nausea, vomiting, pain at the stomach, a sense of tension, and stiffness in the palbebræ, cough, head-ache, soreness of the mouth and ptyalism, its exhibition must be immediately suspended. Externally, white arsenic has been frequently employed, under the form of solution and ointment, as an application to cancers, and various anomalous ill-conditioned ulcers. The powder, unmixed with any other substance, has also been sprinkled upon the sores, but the practice is now abandoned by every judicious surgeon, on account of the violent pain resulting from it, and the not unfrequent fatal consequences of its absorption. "Could I suppose," says Mr. Samuel Cooper, in his valuable Dictionary of Surgery, "a man so rash and ignorant as to revive this murderous practice yet existed in the profession, I should feel disposed to lengthen these remarks; but I am persuaded that, in this country at least, more judgment and knowledge everywhere prevail. The white oxide of arsenic, however, may be applied with more prudence in other forms; either as a lotion, composed of eight grains of the oxide, and the same quantity of subcarbonate of potash, dissolved in four ounces of distilled water, or as an ointment, formed by rubbing together one drachm of the oxide and twelve drachms of spermaceti ointment.

White oxide of arsenic has been long known as one of the most virulent of the mineral poisons. The symptoms which it produces

on the living system are numerous, complicated, and not very determinate: the most constant, are signs of violent inflammation in the stomach; but, in some few instances, there is little sign of irritation in any part of the alimentary canal, and the patient is chiefly affected with excessive prostration of strength, frequent fainting, hectic fever, paralysis, and other affections of the nervous system. The ordinary symptoms are, sickness and vomiting, violent burning pain in the region of the stomach, increased on pressure, a sense of great pain, dryness and constriction in the throat, hoarseness and difficulty of speech, gripings, tenesmus and diarrhœa, painful or difficult micturition, and sometimes total suppression of urine: the respiration becomes difficult, the pulse is small, rapid, irregular, and often almost imperceptible, accompanied with cold clammy sweats and lividity of the feet and hands; the countenance is collapsed, and expressive of great anxiety, the eyes are red and sparkling, the tongue and mouth parched, and sometimes apthous ulcerations are perceived on the tongue; delirium, stupor, and convulsions, sometimes accompany the last stage, and death often occurs about twenty-four hours after the poison is swallowed. The visible effects of arsenic on the body after death will not be found uniform, but vary very much in different cases. The body is sometimes swelled and livid, but more frequently natural, the lungs are sometimes black and distended with blood; the pharynx and œsophagus are generally in their natural state, but the stomach and intestines are almost always inflamed, abraded, or ulcerated. Mr. Brodie, in his experiments, found the inflammation greatest in the stomach and rectum; but in many instances the inflammatory appearances are often very slight, and death seems to take place from some influence of the poison on the nervous system and heart.

In cases of poisoning by this substance, the contents of the stomach should be carefully collected, and after washing them, the arsenious acid, if any be present, will generally be found in the form of a white powder, at the bottom of the vessel into which they are put. There are two methods by which we can determine whether it be the arsenious acid;—1st, by reducing it to the metallic state; 2d, by the application of tests or re-agents in the

humid way. The powder must be dried by a gentle heat, and a portion of it mixed with two or three parts of the black flux, consisting of one part of finely powdered charcoal, and two parts of dry carbonate of potash. The mixture is then to be put into a glass tube, open at one end: the open end is now to be loosely closed by a piece of wood or soft paper, while the other is heated by placing it in red-hot coals, or in the flame of a spirit lamp, when, if arsenic be present, a thin brilliant metallic crust will be found lining the upper part of the tube, and which, when placed on a bar of hot iron, will exhale dense white fumes, and a strong smell of garlic. In order to detect the presence of the white oxide of arsenic by re-agents, the suspected powder should be boiled in distilled water, the solution filtered, and a portion of it put into three test tubes, *a*, *b*, and *c*, as recommended by Mr. Brande. "To *a*, add a drop or two of solution of potassa, and then a similar quantity of solution of sulphate of copper: an *apple-green* precipitate indicates arsenic; if the precipitate be sky-blue, no arsenic is present. To the liquid *b*, add a drop or two of solution ammonia, and then the same quantity of nitrate of silver; if white arsenic be present, a yellow precipitate is formed; if not, there is no change, or only a white cloudiness. To *c*, add a drop or two of liquid potassa, evaporate to dryness; and having added a morsel of wax, heat the residue to redness. Metallic arsenic will sublime, and the garlic smell will be very perceptible upon opening the lower end of the tube, and holding it inclined, so that a current of air may pass through it. The precipitates from *a* and *b*, heated with a little wax, should give similar indications of metallic arsenic. Of the above tests, the first was contrived by Scheele, and the second by Mr. Hume; and, with the corroboration afforded by the third method, they are effectual and satisfactory."

"The medical treatment," continues Mr. Brande, "which should be adopted for the relief or cure of persons poisoned by arsenic, may be summed up in a few words. The vomiting excited by the poison should be encouraged by a dose or two of sulphate of zinc, in preference to ipecacuanha, and copious draughts of mucilaginous liquors, such as barley-water and gruel. The bowels should be emptied by the least irritating means, as by castor oil, or a mixture

of castor and olive oil. Opium, camphor, and ether, may be resorted to, to quiet the nervous irritability; and ammonia, in large doses, has proved of service in stimulating the heart, where its action has been irregular and feeble. But we must recollect the inflammatory action of the stomach and bowels with which we still have to contend, and consequently the stimulating system must give way as soon as may be to a cooling regimen, mild aperients, bleeding, and the usual remedies and treatment. The debility, paralytic affections, and generally broken-down health, are afterwards to be encountered by tonics, sea-bathing, warm and cold, nervous stimulants, and a strict attention to diet, which commonly should be nutritive, but light: milk, and farinaceous food, in preference to animal diet."*

Genus XII.—MERCURY.

Mercure, Fr.; *Mercurio*, It.; *Azóque*, Sp.; *Quicksilber*, Ger.; *Abuc*, Arab.; *Parada*, Sans.; *Paráh*, Hind; *Shwuy-yin*, Chin.

Mercury or Quicksilver is found in the native state, and also combined with silver, with sulphur, and with muriatic acid. Its ores are not numerous; they occur principally in veins or irregular masses in strata of sand-stone, bituminous schistus, secondary limestone, and ferruginous clay. The most productive mines in Europe are those of Almadin, near Cordova, in Spain, Idria in Carniola, the Lower Palatinate, and the Duchy of Deux Ponts. At Guancacavelica, in Peru, the sulphuret exists in an enormous mass, fifty yards in width, which has been worked to the depth of 500 yards; it traverses sand-stone and lime-stone near the summit of one of the Cordilleras, 12,000 feet above the level of the sea. There are other mines of mercury in New Spain and Grenada.

Sp. 1. Native Mercury. Pl. XLIV. fig. 1.—Gedieden Quecksilber, *Werner*; Mercure natif, *Hauy*.—Its colour is tin-

* *Manual of Pharmacy*, p. 36.

1.

2.

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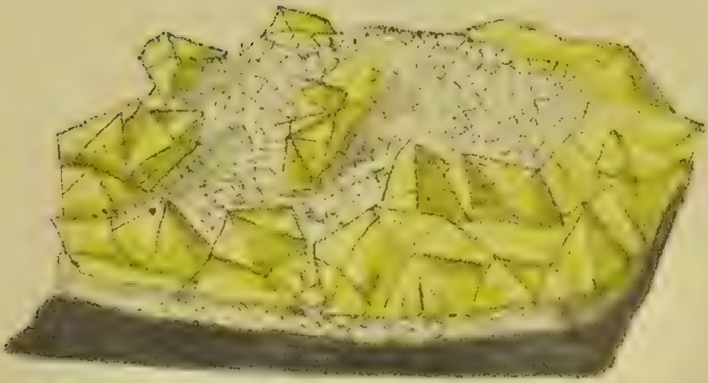

4.

1. *Native Mercury.*
2. *Native Cinnabar.*
3. *Native Sulphur.*
4. *Amber.*

...del. et lith.

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white; it is liquid, opaque, and its lustre is splendent and metallic. Its specific gravity is 13·6 It is volatalize before the blow-pipe at less than a red heat. It is found in small globules, disseminated in the ores of mercury, and other ores that accompany them, principally in rocks of the coal formation.

Sp. 2. NATIVE AMALGAM.—Natürliches Amalgam, *Werner*; Mercure argental, *Hauy*; Dodecahedral mercury, *Jameson.*—The colour is silver-white or greyish. It occurs in plates, in small globular amorphous masses, and also crystalized in rhomboidal dodecahedrons. Internally it is shining, and the lustre is metallic. Its specific gravity is 11·14. It is soft, and when cut with a knife it emits a creaking sound like artificial amalgam. It consists of 74 parts of mercury, and 25 of silver. It is generally associated with native mercury and cinnabar; and it is found principally at Moschellandsberg, in Deux-Ponts

Sp. 3. SULPHURET OF MERCURY, or CINNABAR.—Zinnober, *Werner*; Mercure argental, *Hauy*.—This mineral is divided by Professor Jameson into two sub-species, viz. common and hepatic cinnabar. In *Common Cinnabar* (Pl. XLIV. fig. 2), the colours are cochineal-red, scarlet-red, and carmine-red. It occurs massive, disseminated, dendritic, in granular concretions, and also crystalized in six-sided prisms. It alternates from opaque to translucent; internally shining or glimmering, with a shining or semi-metallic lustre. Its fracture is fine-grained, even, conchoidal, and earthy. It yields a scarlet-red shining streak. Its constituent parts are mercury 84·53, sulphur 14·75—29·25. *Klaproth.* It is from this ore that most of the mercury of commerce is obtained. *Hepatic Cinnabar* has a reddish-brown colour, passing into dark lead-grey. It occurs massive, disseminated, and in globular concretions: the lustre is glimmering and semi-metallic. It is opaque; its fracture is even or slaty; it is easily frangible, and sectile. It contains, mercury 81·8, sulphur 13·7, in 100 parts, mixed with carbon, silica, alumina, and oxide of iron, and a trace of copper. It occurs in considerable masses in slate-clay and bituminous shale at Almaden, in Spain, and in Siberia. In the mine of Idria, this variety is called *Branderz.*

Sp. 4. MURIATE OF MERCURY, or HORN QUICKSILVER.—

Quecksilber hornerz, *Werner*; Mercure muriate, *Hauy*; Pyramidal Corneous Mercury, *Jameson.*—Its colours are pearl-grey or yellowish and greenish grey. It occurs very rarely massive, almost always in small vesicles crystalized in the interior. It is translucent, with a lustre between adamantine and vitreous. It is sectile and easily frangible. Before the blow-pipe it is entirely volatalized, and is said to emit a garlic smell. It is soluble in water, and the solution, mixed with lime-water, gives an orange-coloured precipitate. It contains, oxide of mercury 76, muriatic acid 16·4, sulphuric acid 7·16. *Klaproth.* It is found in the quicksilver mines of the Palatinate, and other places on the Continent.

Mercury exists in nature in very small quantities in the metallic state. The most productive source of the metal is the sulphuret, or the species commonly called *Cinnabar.* It is generally obtained by exposing the ore to heat in a retort, along with lime or iron, either of which combines with the sulphur, and the mercury is separated by distillation. In Germany, the cinnabar, after being sorted, is reduced to powder, it is then mixed with about one-fourth of quick-lime, and put into iron retorts, each of which holds about one half cwt. From forty to fifty of these retorts are placed in a long furnace, and glass receivers adapted to each. Heat is applied to the retorts, by which watery vapour is at first expelled: the receivers are then luted by means of well-tempered clay, and the mercury which comes over is condensed in them. By this process 100 pounds of ore yield from 6 to 10 ounces of mercury.

Fluidity at the ordinary temperature of the atmosphere, together with its splendent metallic lustre, and great specific gravity distinguish mercury from all metallic minerals. When cooled to 39° below 0 of Fahrenheit's thermometer—a degree of cold which sometimes occurs naturally in very high polar latitudes, it becomes solid. It can also be congealed by artificial freezing mixtures, and the evaporation of sulphuret of carbon in the vacuum of an air-pump. In this state it is malleable, and may be cut with a knife. It is perfectly opaque, inodorous, and insipid, of a white colour, but rather bluer than that of silver. Its spe-

cific gravity at 47° above 0, is 13·6. It is volatalized at a red heat, and its vapour rises in small quantities, even at the common temperature of the air. At about 660° Fahrenheit, it boils rapidly and may be purified by distillation. When mercury is violently agitated for a long time in contact with atmospheric air, it becomes converted into a black, insipid, insoluble powder or *protoxide*, which consists of 200 parts of metal and 8 of oxygen. When heated to near its boiling point, it combines slowly with the oxygen of the air, and is converted into a brilliant crimson-coloured scaly mass, which is the *red* or *peroxide* of mercury. A careful analysis shows that it contains just double the quantity of oxygen in the protoxide, or 16 parts in every 200. Both the oxides of mercury combine with the acids and constitute salifiable bases. Mercury combines with chlorine in two proportions, constituting the well-known and highly important substances, *calomel* and *corrosive sublimate*. It combines also with sulphur, phosphorus, iodine, and most of the metals forming alloys, which have been called *amalgams*. By triturating mercury with unctuous or viscid substances, it is changed partly into protoxide, and partly into very minute globules.

Mercury is brought to this country in leathern skins or large iron bottles, and when in the original packages it is generally very pure. It is often adulterated by the admixture of other metals, particularly lead, tin, zinc, and bismuth. When any of these are present, the metal has a much duller appearance than it usually presents, and is covered with a grey film; when a small portion is separated, the globules do not preserve exactly the spherical form, nor unite easily with each other; and when agitated in a phial, it soils or adheres to the glass. Lead is detected by digesting the sophisticated mercury in nitric acid, and adding sulphuretted hydrogen or an alkaline hydro-sulphuret to the solution, which immediately occasions a copious white precipitate. Bismuth is discovered by dropping the nitric solution into a large glass of distilled water, when the subnitrate of bismuth will be precipitated in the form of a white powder. If tin be present, a purple precipitate will be formed on adding a solution of the nitro-muriate of gold. Zinc is detected by exposing the mercury to a strong heat; the

pure metal will be volatalized, but the zinc will burn with a fine green flame.

In its natural state this metal is not now used medicinally;* but when rendered active on the system by any of the modes of preparation to which it is subjected, it produces very remarkable effects on the animal œconomy. It operates as a powerful and general stimulant, it enters into the circulation increases the quickness of the pulse, and sometimes produces a slight degree of what may be called fever. By its stimulant operation on secreting organs, it augments some of the secretions, particularly that of the salivary glands, an effect scarcely produced by any other substance not locally applied. It generally increases the cuticular discharge, and frequently that of the kidneys; it appears also to promote the secretion of bile, and probably of the other intestinal secretions. It appears in a peculiar manner to excite the action of the absorbent system; hence the emaciation which is the consequence of its continued use. Sometimes it increases one secretion, sometimes another, but its most characteristic effect is the increased flow of saliva which it generally excites if given in sufficient quantity. It causes an unpleasant metallic or coppery taste in the mouth, of which persons are particularly sensible in the morning; the breath becomes fœtid, the tongue white, and the gums spongy, tender, and swollen. If the action of the remedy be continued it causes ulceration and sloughing of the mouth and gums, loss of appetite, extreme debility, and a constant and profuse secretion of the salivary glands. The effect which is thus produced upon the mouth, is considered a criterion of the general influence upon the system of the remedy in the cure of syphilis. When mercury fails to act on the mouth and salivary glands it will often be found that it increases the discharge by the skin, or operates powerfully as a diuretic.

"From these diversified effects which mercury produces, it is capable of being applied to the treatment of numerous states of

* Mercury is said to have been highly prized by the ladies, in the reign of Charles II. taken in doses of a tea spoonful night and morning, as a cosmetic. In those days the sweepings of the drawing-room were among the most profitable of the servants' perquisites—so considerable was the quantity of second-hand mercury thus collected.

disease. In the febrile affections of warm of climates, yellow fever, and bilious remittent fever, it is a remedy of the highest value. It is probably useful principally as an evacuant; these forms of fever being peculiarly connected with a disordered state of the intestinal canal and abdominal secreting organs; and it is accordingly under the form of calomel, the mercurial which acts most powerfully on the liver and intestines, that it is chiefly employed. Some benefit is probably, at the same time, derived from its general stimulant action, as it proves most successful when given to that extent as to affect the system. Advantage is derived from it, probably from a similar mode of operation, in dysentery, especially when it is given in combination with opium. In the fevers of cold climates it is less employed. There are some forms of inflammatory action in which mercury is useful, particularly in rheumatism. And in that chronic inflammation which affects glandular organs, it is the principal remedy both in counteracting it, and in removing that state of morbid structure which is often its consequence. Hence the peculiar advantage derived from mercurials in chronic hepatitis, and induration of the liver, in glandular obstructions and schirrosity, and in indolent tumors. Calomel is the preparation which in these cases appears to be most effectual, though the introduction of mercury by friction is also employed perhaps with equal success. In various diseases dependant on spasmodic action, mercury affords the most powerful remedy. In tetanus, particularly, if the mercurial action on the system can be fully established, the violent spasm is sometimes resolved and calomel given to a large extent, aided by mercurial inunction, affords the remedy which has been most frequently attended with success. In the milder affection of trismus, it is employed with the same views. It is also a valuable remedy in croup. In all these cases, calomel is the preparation usually employed. The stimulant operation of mercury on the absorbent system, renders it useful in the different forms of dropsy. It is given to the extent of exciting salivation in hydrocephalus; in ascites it is more usually employed to promote the action of diuretics, and in that species of dropsy when it depends on induration of the liver, and also in dropsy of the ovarium, it proves still more useful by its deobstruent power. Its stimulant operation on the

uterine system leads to its employment as an emenagogue. Different obstinate cutaneous diseases, lepra, tinea capitis, scabies, and others, are occasionally removed by the internal administration of mercury as an alterative; and these, as well as various forms of cutaneous eruption and ulceration, often yield to the external application of mercureal preparations.

"The most important medicinal operation of mercury remains to be stated—that displayed in removing the disease induced by the syphilitic poison. In this its power is nearly, if not altogether, specific; no article in the materia medica can be substituted for it; and there may be affirmed of it, what cannot with equal justice be said of any remedy employed in the treatment of any other morbid affection, that, if duly administered, it will scarcely ever fail in effecting a cure. It is difficult to assign any satisfactory theory of its operation. Its efficacy has been ascribed to its general evacuant power, in consequence of which the syphilitic virus is discharged from the body. But the speedy disappearance of the local symptoms of syphilis under its use, and even from its local application, affords a proof that it operates on some other principle; no similar advantage is derived from any other evacuant; and its efficacy is not proportional to the evacuation it excites, but is frequently displayed where this is altogether insensible. The opinion has been advanced, that it acts as an antidote to the venereal virus, neutralizing it somewhat in the manner in which one chemical agent subdues the properties of another—an opinion extremely vague and hypothetical, and rendered improbable from the consideration of the very small quantity of some of the more active preparations of mercury, from which a cure may be obtained, compared with the large quantity of others less active that require to be administered. The explanation advanced by Mr. Hunter, that the efficacy of mercury in the treatment of syphilis depends on its general and permanent stimulant operation on the system, by which it induces and keeps up an action incompatible with that morbid action which constitutes the disease, until the virus is destroyed by the chemical changes going on in the system, or until it is eliminated from the body by the usual excretions, is on the whole most probable.

The mode of administering mercury, for the cure of the venereal disease, under all its forms, is now ascertained with sufficient precision. There is no advantage in giving it so as to induce profuse salivation; this is even to be avoided as hurtful; at the same time it is proper that salivation should be excited to a certain extent, not probably as essential to its efficacy, but as a proof of its full action on the system being obtained; this is to be kept up for a certain time, longer or shorter, according to the state of the symptoms, and the previous continuance of the disease. Exposure to cold is avoided, as being liable to cause the more partial operation of mercury on the salivary glands; and the state of irritation is diminished, or determination to the intestines producing purging is obviated, by the exhibition of an opiate. When profuse salivation occurs, the remedies employed to check it are cathartics in moderate doses, small doses of opium, the application of a blister to the throat, and the administration of the sulphuret of potass; the last being employed from the doubtful hypothesis, that its chemical agency may neutralize the mercury. Free exposure to a cool air is, according to the observations of Mr. Pearson, more effectual than any other method. When the morbid irritation from the action of mercury rises too high, producing a state of exhaustion which sometimes proceeds rapidly to an alarming extent, the administration of the remedy must be immediately suspended; and in this case, also, exposure to a cool atmosphere is advantageous."*

The various forms under which mercury has been employed medicinally are very numerous; they may, however, be reduced to five classes:—1. The pure metal, (which has been absurdly exhibited with the view of operating mechanically in cases of obstructed bowels.) 2. Its combination with oxygen. 3. Its combination with sulphur. 4. Its combination with chlorine. 5. Its combination with acids.

Oxides of Mercury.

There are two oxides of mercury; the *protoxide,* which is of a *black* or dark-grey colour, and consists of 200 mercury + 8 oxygen;

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* Murray's *System of Materia Medica,* vol i. p. 200.

and the *deutoxide* or *peroxide*, which is of a red colour, and contains twice as much oxygen as the protoxide, consisting of 200 mercury+16 oxygen. Of these, the former is comparatively mild, and appears to be the active ingredient in the *pilulæ hydrargyri*, or *blue pill*; in the *hydrargyrum cum creta*, and in the *unguentum hydrargyri*, or *mercurial ointment*. The latter, or *red oxide* of mercury, is a virulent poison; it is now, therefore, seldom, if ever, administered internally.

Black Oxide, or Protoxide of Mercury.—*Hydrargyri oxidum cinereum*, Ph. L.—The London College directs this to be prepared by boiling one ounce of chloride or sub-muriate of mercury in a gallon of lime-water, stirring it constantly until the oxide of mercury falls down. The precipitate must then be washed with distilled water, and dried by a gentle heat. The black or grey oxide of mercury was formerly called *Æthiops per se*, and is designed to be used as a substitute for those preparations in which the mercury is oxidated by trituration; but it varies considerably in chemical composition, and is scarcely ever prescribed. It is given in the dose of from one to three grains twice a-day, usually under the form of pill. The protoxide, as it exists in the *Pilulæ hydrargyri* or *blue pill*, is by far the best preparation for obtaining the general action of the metal upon the system. Three grains of the mass contains one grain of the mercury; and the usual dose is from six to ten grains twice a-day until the mouth be affected. In larger doses it appears to increase the secretion of bile, and acts as a cathartic; hence it has been recommended as an occasional purgative conjoined with extract of colocynth, rhubarb, or aloes, where from the deficiency or morbid state of this secretion, the alvine evacuations are clay-coloured or white, attended with general languor, drowsiness, or general inactivity of the system. Two or three grains of blue-pill, given at bed-time, is a favorite remedy with some practitioners in dyspepsia, especially where the stools are clay-coloured; and it is beneficially employed to excite the action of the absorbents in dropsies, conjoined with digitalis or squill. By triturating mercury with chalk, it forms the *Hydrargyrus cum creta*, a preparation which is frequently prescribed as a mild alterative for children in tabes mesenterica,

porrigo, and other cutaneous diseases, in doses of from gr. v. to ʒss. twice a-day, blended with any viscid substance. The *Unguentum Hydrargyri*, in which the metal is in the state of protoxide, is the form under which mercury is introduced into the system, through the superficial absorbents. From one to two drachms of the strong ointment is forced through the cuticle, by friction upon the inside of the thighs and calves of the legs every night in a warm room, or before the fire, until the constitution is affected. This mode of applying mercury is frequently resorted to in venereal cases, in obstinate hepatic obstructions, and in some dropsical affections, particularly hydrops articuli, and hydrocephalus, where the object of the treatment is to stimulate the absorbents. *Mercurial plaster* is the metal triturated with oil and resin, and mixed with litharge plaster; it is sometimes applied to indolent glandular tumours and indurations, as a discutient.

Red Oxide, or Peroxide of Mercury.—By exposing mercury to heat in a shallow vessel, at a temperature of about 600°, it slowly absorbs oxygen from the air, and is converted into a peroxide. It is obtained in the form of scales and crystaline grains of a bright red colour; it is the *Oxydum hydrargyri rubrum* of the London Pharmacopœia; and was formerly called *Hydrargyrum precipitatum per se*, and *hydrargyrum calcinatum*. The red oxide is a very active and dangerous preparation of mercury, and is now very seldom exhibited internally, except where other remedies fail. The best form for its administration is that of pill, combined with opium in very small doses, such as one-fourth or one-eighth of a grain, night and morning. It is principally used as an external stimulant and escharotic. For this purpose it is either sprinkled upon the diseased surface, finely levigated, or applied in the form of ointment, mixed with lard. The ointment is one of the most common stimulating dressings for various kinds of ulcers, and is an excellent application to the inside of the eye-lids in cases of chronic ophthalmia, and opacities of the cornea. The peroxide, prepared by dissolving the metal in nitric acid and then evaporating the solution to dryness, is the *hydrargyri nitrico-oxydum* and is more acrid and caustic than the oxide obtained by heat. The white precipitate of mercury, *Hydrargyrum precipitatum album*,

which is prepared by decomposing a solution of muriate of ammonia and corrosive sublimate by sub-carbonate of potass, consists of the peroxide of mercury combined with the muriate of ammonia. It is too acrid for internal use, but is frequently employed either alone or mixed with powdered starch for the destruction of vermin; made into an ointment with lard it forms a very useful application in certain cases of porrigo, and some other cutaneous eruptions.

Sulphurets of Mercury.

There are two sulphurets of mercury; the black sulphuret, *Hydrargyrum sulphuretum nigrum,* commonly called *Æthiops Mineral*; and the bi-sulphuret, which is of a fine red colour, and well known as a pigment under the names of *Cinnabar* and *Vermilion.* The former is a very uncertain, inactive, and useless remedy, and is scarcely ever employed in the present practice. Its dose, as an alterative and anthelmintic, is from gr. x. to ʒss. or more. The red sulphuret is only used in medicine for mercurial fumigation, a portion of it being thrown on a red-hot iron, while the fumes are either inhaled or directed on the diseased parts.

Chlorides of Mercury.

Mercury combined with chlorine forms two very important preparations. The one is termed the *proto-chloride,* and has been long known by the name of *Calomel,* sub-muriate or mild muriate of mercury. The other, the *bi-chloride,* is also well-known by the name of *Corrosive sublimate,* and is the oxymuriate of mercury of the London pharmacopœia.

Proto-chloride of Mercury, Sub-muriate of Mercury, or Calomel.—*Hydrargyri Submurias,* Ph. L.—This compound may be obtained by triturating four parts of the bi-chloride of mercury (*corrosive sublimate*) with three parts of metallic mercury until the globules disappear, then subjecting it to sublimation; but the proto-chloride may more easily be prepared by pouring into the solution of the metal, in nitric acid, a solution of chloride of

sodium, or common salt. It is precipitated in the form of a ponderous white powder, which must be washed and dried by a gentle heat. Calomel, when pure, has a pale straw colour; it is perfectly insipid, inodorous, and nearly insoluble in water. Its specific gravity is 7·2. When exposed to heat, it sublimes unaltered; and when the surface of sublimed calomel is scratched, it always exhibits a yellow streak. It is decomposed by lime-water and the alkalies, which instantly render it black, the protoxide of mercury being one of the results; it is also decomposed by some of the metals, and by the sulphurets of potass and of antimony. Nitric acid dissolves calomel, converting it into corrosive sublimate. It is composed of one proportional mercury 200, and one proportional chlorine 36, giving 236, as its equivalent representative number.

Calomel is one of the mildest and most useful of the mercurial preparations. " It is not so much employed as a remedy in syphilis, principally from its being liable to induce purging; but when this is obviated by the addition of small doses of opium, it is given in the dose of one or two grains, morning and evening, and soon affects the general system. It is the mercurial, however, which is chiefly employed in the treatment of other diseases in which mercury is prescribed. To the treatment of some of them it is peculiarly adapted by its action on the intestinal canal, and the secreting organs connected with it; hence, its employment in febrile affections, in hepatitis, and chronic induration of the liver, in scirrhous of other visceral organs, in dysentery, and as a remedy in worms. The mildness of its operation rendering it safe to administer it in large doses, so as rapidly to bring the system under the action of mercury, renders it equally proper for administration in tetanus, hydrophobia, croup, and other diseases in which it is required. The same mildness adapts it to continued use, and hence, the preference given to it in cutaneous affections, in glandular obstructions, in dropsy, and wherever mercury is employed as an alterative. It not only produces the general effects of a mercurial, but also, when given in sufficient doses, acts with certainty and mildness as a cathartic. It is hence often employed to promote the operation of other cathartics, and it has the peculiar advantage, that it does so without adding to the

irritation which they are liable to occasion. Hence, this combination is peculiarly useful where it is difficult to cause purging, or where, from the state of the stomach, the usual cathartics are liable to be rejected, especially when they are given in large doses. The dose, as a cathartic, is from five to ten or even fifteen grains. When prescribed with other intentions, the dose is various ; as an alterative a grain is given night and morning, and this, after being continued for some time, will affect the system. When it is necessary that this should be done more speedily, a large dose is prescribed, and, if necessary, its purgative operation may be obviated by opium."* Calomel and lime-water forms what is commonly termed the *black lotion,* so much employed by surgeons as a soothing application to venereal sores and excoriations.

Bi-chloride of Mercury, or Corrosive Sublimate. *Hydrargyri Oxymurias.* Ph. L.—Bi-chloride of Mercury is prepared for medicinal purposes by boiling two pounds of mercury with two and a half pounds of sulphuric acid to dryness, in a glass vessel, then mixing the dry mass with four pounds of chloride of sodium (common salt), and subliming. When thus obtained, it is of a crystaline texture, colourless, and semi-transparent. It has a very disagreeable, styptic, and somewhat acrid, metallic taste. Its specific gravity is 7·2. It is soluble in 20 parts of water at the temperature of 60°, and 2 of boiling water ; it is also soluble in alcohol, and requires little more than three parts of that fluid for its solution. Muriate of ammonia considerably increases its solubility, one part rendering five parts soluble in about five of water. It dissolves readily in muriatic acid, but is insoluble in concentrated nitric and sulphuric acids. The fixed alkalies and alkaline earths decompose it, precipitating it from its solution of an orange-yellow colour, which becomes brick-red. It is also decomposed by many metals, compound salts, and vegetable infusions. In this preparation, as the name implies, the mercury is combined with one proportional of metal and two of chlorine. The bi-chloride, or proto-chloride of mercury, as it is also called, is the most active of all the preparations

* Murray's *System of Materia Medica,* v. i., p. 208.

of this metal; even in a small dose it is apt to occasion severe griping and diarrhœa; in larger quantities it proves one of the most violent poisons with which we are acquainted. It was formerly extolled as an anti-syphilitic; but it is very seldom prescribed by practitioners at the present day for the cure of the venereal disease. Although it soon affects the system, its operation does not appear to be sufficiently permanent; hence, when the symptoms of syphilis have disappeared under its use, they are liable to return when it is suspended, or the disease occurs in some of its secondary forms. It is employed with more advantage as an alterative for the cure of old ulcers, chronic rheumatism, lepra, and other obstinate cutaneous affections. In these cases, it is usually conjoined with bark, antimonials, or the compound decoction of sarsaparilla. It is a powerful engine in the hands of empirics, and corrosive sublimate is the active ingredient in many of the anti-venereal remedies which are recommended as containing no mercury. *De Velno's vegetable syrup* owes its activity to corrosive sublimate, desolved in the decoction of the woods; and, *Spilsbury's drops*, is a weak solution of this salt, in the compound tincture of gentian.* The dose of corrosive sublimate is from one-quarter to one-eighth of a grain twice a day; and it is best administered in solution, or made into a pill with extract of poppies. A very dilute solution is sometimes used as a gargle in venereal sore throat, and as a lotion in some cutaneous eruptions. According to Mr. Brande, *Gowland's lotion,* long celebrated in such cases, is a solution of corrosive sublimate in emulsion of bitter almonds, in the proportion of about a grain to an ounce. "Applications of this sort require to be used with much circumspection, especially upon delicate and irritable skins, where they sometimes excite erisepelatious inflammation, and a permanent redness of the part."

The effects produced by corrosive sublimate when administered in too large doses, either by mistake, or designedly as a poison, are an acrid, styptic, metallic taste in the mouth, with a sense of

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* SPILSBURY'S DROPS.—Corrosive sublimate, and tartarized antimony, of each *two* grains; cinnamon water, *one* ounce; compound tincture of gentian, *three* ounces; oil of sassafras, *four* drops. Mix. Dose a tea-spoonful three times a day.

burning and fulness in the mouth and throat, sickness, vomiting of frothy matter, sometimes of blood, salivation and ulceration of the mouth and gums, loss of teeth, and affections of the bones, violent pains in the bones, muscles, and joints, cold sweats, tremors, palsy, tetanus, convulsions, and death. It has been already stated, in a former part of this work, that the white of egg decomposes corrosive sublimate, by converting it into proto-chloride of mercury or calomel, and when given in sufficient quantity has succeeded as an antidote. According to Peschier the white of one egg is required to render four grains of the poison innocuous.* If this cannot be procured, linseed tea, barley-water, broth, or even plain water may be given; but oily substances, often had recourse to, are useless, and often injurious by impeding the action of other remedies, The secondary treatment must resemble that adopted in gastritis and enteritis; general and local bleeding, fomentations, warm bath, and in general the antiphlogistic regimen.

Salts of Mercury.

The salts of mercury are generally distinguished by their nauseous, styptic taste. Those that are soluble in water give a black precipitate with alkaline hydro-sulphurets; gallic acid gives a yellow precipitate, and when a plate of copper is introduced into them, metallic mercury is precipitated. They are volatalized by heat, and if they be mixed with carbonaceous, matter metallic mercury is obtained.

Yellow Sub-Sulphate of Mercury, or Turbith Mineral. *Sub-sulphas Hydrargyri flavus*, Ph. E.—This salt is prepared by boiling two parts of mercury in three of sulphuric acid to dryness, and throwing the white mass obtained in this manner into boiling water, after it has been reduced to powder. The yellow sub-sulphate is immediately thrown down, which must be washed repeatedly with distilled water and dried by a gentle heat. It

* Corvisart's *Journal de Medicine*, xxxviii. p. 77.

occurs in the form of a bright lemon-yellow powder, of a specific gravity of 6·444; it is inodorous, nearly insoluble in water, and has an acrid taste. The sub-sulphate of mercury mixed with liquorice powder, and snuffed up the nose at bed-time, is sometimes prescribed as an errhine in chronic ophthalmia. Taken internally, in a dose of from four to six grains, it operates as a powerful emetic. In smaller doses, it was formerly much employed as an alterative and diaphoretic; but it is extremely liable to act violently on the stomach and bowels, and as it has no particular advantage attending its administration, it is nearly discarded from practice in this country.

Acetate of Mercury. *Acetas Hydrargyri*, Ph. E. *D.*—This is prepared by dissolving three ounces of mercury in four and a half ounces of diluted nitric acid, and adding a solution of three ounces of the acetate of potass in eight pounds of boiling water. The solution deposits crystals of the acetate of mercury, which must be washed with cold distilled water, and dryed by a gentle heat. The acetate of mercury, is now very seldom employed as an anti-syphilitic; it is considerably less active than the preceding preparation, and forms the basis of the once celebrated Keyser's pills. The dose is from gr. i. to grs. vi. twice a-day.

Order II.—INFLAMMABLE MINERALS.

This order comprises such mineral substances as burn more or less easily, or whose principal character is inflammability at not very high temperatures. When solid, they are easily broken; they are soft, yielding easily to the knife; their specific gravity seldom exceeds 2.0; they are composed chiefly of carbon or of sulphur, either pure or combined with hydrogen, and more or less earthy and metallic matter.

Genus I.—SULPHUR.

Soufre, Fr.; *Solfo*, It.; *Azufre*, Sp.; *Schwefel*, Ger.; *Sera*, Rus.

Sulphur is found in nature, nearly pure in the mineral kingdom; and likewise in combination with various metals, forming some of the most abundant and important metallic ores, as the sulphurets of iron, copper, and lead. Sulphur is found most plentifully in or near the craters of dormant volcanoes; it is also found lining the cavities or fissures of lava, and sometimes, though rarely, in veins traversing primitive and secondary rocks. Sulphur is divided by some mineralogists into two sub-species or varieties; native and volcanic.

1. Native Sulphur. Pl. XLIV. fig. 3.—Natürlischer Schwefel, *Werner*.—The colour is various shades of yellow, sometimes reddish, or tinged with green. It occurs massive, disseminated, investing other minerals, and crystallized in acute double six-sided pyramids. Its lustre is glistening and resinous; it is opaque or translucent. It is brittle and easily frangible. It becomes negatively electric by friction. Its specific gravity is about two. It burns with a lambent blue flame, and suffocating odour. It occurs in considerable abundance in primitive and secondary mountains, either pure, or in a state of combination with the metals. It is also met with in alluvial districts, deposited in crusts on the surface of the soil, particularly near sulphureous springs.

2. Volcanic Sulphur. — Vulcanischer Natürlicher Schwefel, *Werner*.—Its colour is pale-sulphur yellow. It occurs massive, stalactitic, vesicular, investing, and in small pyramidal chrystals. In other characters it agrees with the preceding sub-species. It is found only in volcanic countries, and is much purer than the sulphur obtained by sublimation from pyrites, which always contains a portion of arsenic, or other metallic matter. Solfaterra, near Naples, and Sicily, are the principal repositories of volcanic sulphur in Europe, where it is collected in considerable quantities for the purposes of commerce. Sulphur sublimes at 600°, and condenses into the form of a fine powder, which, from

its lightness, is commonly called *flowers of sulphur:* the residue is known in the shops under the name of *sulphhur vivum.* When melted and run into cylindrical moulds, it is termed *roll sulphur,* and is usually less pure. Sublimed sulphur is of a pale yellow colour; it is insoluble in water; it is soluble in boiling oils, and in alcohol, when the two substances are brought into contact in the state of vapour. It combines with oxygen, hydrogen, carbon, chlorine, phosphorus, iodine, with the alkalies, many of the earths, and almost all the metals.

Sublime sulphur is used in medicine as a gentle laxative and diaphoretic. From the mildness of its operation it has long been recommended in hemorrhoidal affections, and in other cases, where more irritating cathartics would be injurious. It is usually prescribed in the form of powder, with magnesia, or in combination with electuary of senna, in dozes of from ʒi. to ʒii. twice a day. When its use is continued for some time, it appears to pervade the whole system in a remarkable manner, and manifestly transpires through the skin; from which circumstance it has been much employed in some cutaneous eruptions, and has been conceived to possess a specific power in the cure of scabies, especially when applied externally, in the form of ointment, and taken internally at the same time, in half drachm doses, with an equal part of super-tartrate of potass. Dr. Mackensie, on whose authority I am disposed to place much confidence, for the disease seems to be very common in many districts in Scotland, says this mode of procedure will generally cure the itch in three days.* Sulphur has also been found serviceable in rheumatism, gout, chronic catarrh and some other pulmonary affections, probably from its action on the skin.

Genus II.—MINERAL RESIN.

This genus contains two species, yellow Mineral Resin, and black Mineral Resin, both of which are highly inflammable, and,

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* *Elements of Pathology and Practice of Physic*, vol. ii. p. 206.

like coal, are composed principally of carbon in combination with hydrogen.

Sp. 1. Yellow Mineral Resin, or Amber. Pl. XLIV. fig. 4.—Succin, *Hauy.* Bernstein, *Werner.* Gelbes Erd-Harz, *Mohs.*—It occurs in small irregular massive pieces, which are translucent or transparent, of a whitish, wine-yellow, or yellowish-brown colour, and often incloses insects; the fracture is more or less conchoidal, and the lusture resinous. It is brittle, and yields easily to the knife. Its specific gravity is about 1·08. When rubbed it gives out an agreeable smell, and becomes strongly resino-electric. It softens when moderately heated, and at a higher temperature it burns with a yellow flame, and fragrant odour. Its constituent parts are resin, an empyreumatic oil, and succinic acid. Amber is found in alluvial soil near Koningsberg, in Russia, where it occurs in beds of bituminous wood; and is said to have been observed imbedded in secondary limestone. It is also thrown up by the sea on the shores of the Baltic, Germany, Poland, and other countrys.

Amber, when taken into the stomach, even in large quantities, is perfectly inert; it is introduced into the list of the materia Medica only as affording, by distillation, an acid and oil, both of which have been used in medicine. The oil is at first thick and brown, but by repeated distillations with water, becomes thinner and of a paler colour. It was formerly celebrated as an anti-spasmsodic, and as such often prescribed in hysterical and convulsive affections, in a dose of from ten to fifteen drops. It is now scarcely ever employed, except as an external stimulating application in hooping-cough, paralysis, and chronic rheumatism. The salt (*sal succini,* E. D.), obtained along with this oil is impure succinic acid, and is never used in the present practice.

Sp. 2. Black Mineral Resin. — Schwarzes Erd-Harz, *Mohs.*—This species is divided into three sub-species, viz. Naptha, Mineral Oil or Petroleum, and Mineral Pitch or Bitumen. The two former only are used in medicine.

1. Naptha.—Bitumen liquide blanchatre, *Hauy.*—This substance resembles oil, being perfectly liquid and transparent, feels unctuous, and has a pale yellowish colour, inclining to brown. It

exhales an agreeable bituminous smell, and burns with a bright white flame on the approach of a lighted taper. Its specific gravity is 0.7. Naptha exists in considerable springs in some parts of Italy, on the shores of the Caspian Sea, in the Caucasus, and other places. It may also be obtained by distilling petroleum, or the tar which is disengaged during the destructive distillation of pit coal, and which is commonly called coal-tar. Naptha bears a considerable analogy to the oil of turpentine in its medicinal properties; hence it has been used internally as a sudorific and anti-spasmodic in asthma and chronic catarrh, and externally, as a stimulating application in chronic rheumatism and afflictions of the joints. The dose is from ten to thirty drops.

2. PETROLEUM. — Bitume liquide noiratre, *Haüy.* — Erdöl, *Werner.*—This bituminous substance, known also under the names of *Barbadoes* and *Mineral* tar, has long obtained a place in our pharmacopœias. It is of the consistance of common tar, has a strong disagreeable bituminous odour, and is of a dark blackish brown colour. It exudes abundantly from rocks, generally of the coal formation, in Shropshire, in the territory of Modena and Parma, in Sicily, Persia, and other countries. In its medicinal properties it agrees with naptha, but it is less eligible for internal administration. In Germany it has been extolled as an anthelmintic in cases of tænia.

ORDER III.—EARTHY MINERALS.

This class comprises all minerals that are composed of one or more earths, either pure, or in combination with the alkalies, with sulphur, with oxygen, or with acids. They are insipid, destitute of true metallic lustre, insoluble in water, uninflammable, fixed, and incapable of being volatalized at a high temperature before the blow-pipe, and their specific gravity is always below 5.

Genus I.—LIMESTONE.

Pierre à chaux; chaux carbonate, Fr.; *Ossicarbonato di calce*, It.; *Kalkstein* Ger.

Lime exists abundantly in nature in combination with carbonic or sulphuric acids, and not unfrequently with the fluoric and phosphoric acids. It is also frequently combined with magnesia, but more sparingly with the other earths. The common compact limestone, and the varieties comprehended under the term Carbonate of Lime, is so common in every country, as to render any description of its characters and geographical distribution unnecessary. Lime, which is medicinally used, may be procured in a very pure state from Calcareous Spar.

Sp. 1. Calcareous Spar. — Chaux Carbonatée, *Hauy*. Kalkspath, *Werner*.—Its usual colours are white, tinged with yellow, and it is found of various shades of red, blue, green, grey, brown, and greyish black. It occurs massive, and in a great variety of external shapes, also very frequently chrystalized. The primitive form is an obtuse rhomboid; the secondary forms far exceeds that of any other mineral hitherto discovered: Bournon has enumerated 642, and many more might be described. It is scratched by fluor spar, and yields easily to the knife. It is rather brittle, and breaks into rhomboidal fragments. The specific gravity is about 2·50. It is translucent or transparent; that of Iceland, Pl. XLV., fig. 1., known under the name of *Iceland Spar*, is double refractive in a high degree. According to Woollaston, its constituents are lime 56, carbonic acid 44. It occurs in veins and strata in almost every kind of rock.

Pure lime is obtained by exposing limestone, or calcareous spar, to a strong heat. It is of a fine white colour, and is moderately hard; it requires an intense heat for its fusion, and has an acrid alkaline taste. It is sparingly soluble in water; and the solution is the form under which it has been exhibited medicinally. "*Lime-water*, as it is named, is used with advantage in dyspepsia; its beneficial effects arise principally from its tonic and astringent

quality, as in the small quantity which water can dissolve, it can have little effect, by any chemical agency, in obviating acidity. It is employed too as an astringent in chronic diarrhœa, and in leucorrhœa. *Carbonate of Lime,* or Chalk (*Creta*), is used as an antacid; and *Phosphate of Lime* has, from theoretical views, been proposed as a remedy in rickets and molities ossium. *Muriate of Lime* is a more active substance, and more powerful tonic; it is prepared, according to a formula given by the Edinburgh and Dublin Colleges, by decomposing carbonate of lime by muriatic acid, and is obtained in the state of a saturated solution. In its action on the system, it has a considerable analogy to muriate of barytes, and, like it, has been used principally in scrofula and hectic fever, and in dyspepsia. Its dose is ʒss. of the saturated solution; and, as it is a medicine of considerable activity, it requires to be given with caution. Like other saline substances designed to act on the general system, it is probably most successful when administered in small doses, with large dilution, as in large doses, and a more concentrated form, its absorption is counteracted, and its action is confined to the intestines." *Chloride of Lime,* commonly called *bleaching powder,* is of great importance in the arts, also in medicine, and the manufacture of it is carried on upon a very large scale. It is prepared by passing chlorine gas into chambers constructed for the purpose, in which strata of fresh slaked lime, in fine powder, is exposed to its action, in trays. The gas is absorbed with rapidity, and much heat is evolved. The chloride of lime is thus obtained in the form of a dry white powder, which possesses a faint odour of chlorine, and a strong penetrating taste. It is soluble in water in small quantity; the solution is decomposed by the different acids, even by the carbonic, which it attracts from the atmosphere, while the chlorine is disengaged slowly, and the carbonate of lime produced. Advantage has been taken of this property for the purpose of arresting the decomposition of animal substances, and of correcting and sweetening the air contaminated with putrid effluvia. Gaseous chlorine has been long known as having the power of neutralizing the volatile principles given out by bodies in a state of putrefaction, or infectious vapours; but such is the hurtful nature of chlorine to respiration, that the greatest caution must

be taken not to inhale it in any quantity. In the process, however, above described, it is so gradually evolved, as not to occasion inconvenience; and it may thus be diffused even in the chambers of the sick, without the slightest annoyance. Under every circumstance, whether infection be suspected or not, unpleasant exhalations are instantly destroyed by this salutary process, and a freshness communicated to the air, which does not merely cover disagreeable smells, like common fumigations, but effectually destroys them. The chloride is cheap and easily procured; and the quantity of a table-spoonful, stirred into as much water as may be contained in a soup-plate, and renewed every two or three days, is quite sufficient in all ordinary cases. In sick-rooms, to destroy the odour of discharges from confined patients, and in fevers of a decidedly contagious character, the solution should be sprinkled about the chamber, and the linen of the patient thrown into a pail of water, in which double the above quantity of the salt has been mixed. But, besides the property which belongs to the chloride of lime of disinfecting foul air, it has also been medicinally employed as an excellent lotion for excoriations, chilblains, foul ulcers, and gangrenous sores. The solution is likewise used as a gargle in putrid sore throat; and forms the best lotion in ptyalism hitherto discovered.

Genus II.—MAGNESIA.

This earth has been discovered pure in the mineral kingdom; but more commonly combined with silica, alumina, lime, and other earthy substances, or with acids, and in solution in sea-water, and several mineral springs.

Sp. 1. Native Magnesia. *Bruce.*—Its colour is snow-white, occasionally with a tinge of green. It occurs massive, and in granular and prismatic concretions. It is semi-transparent, with a shining and pearly lustre, but, by exposure to the weather, the surface becomes dull and opaque; it adheres slightly to the tongue, and is so soft as to yield easily to the nail. Its specific gravity is

2·13. Before the blow-pipe it becomes soft and friable, and loses weight. It is soluble in sulphuric, nitric, and muriatic acids. According to Dr. Bruce, it consists of pure magnesia 70, water 30, in 100 parts. Native magnesia has hitherto been found only in small veins that traverse a rock of serpentine, at Hoboken, in New Jersey.

Genus III.—BARYTES.

Baryte, Fr.; *Barite*, It.; *Baryterde; Schwerde*, Ger..

The earth called Barytes exists in nature in combination either with sulphuric or carbonic acid, forming two distinct species of minerals, the Sulphate and Carbonate of Barytes. It is the heaviest of all earthy minerals, except Zircon. Both species are used in pharmacy for preparing the muriate.

Sp. 1. Sulphate of Barytes, or Heavy-Spar.—(Pl. XLV. fig. 2.)—*Baryte* sulphaté crystalizée, *Hauy*; Schwerspath, *Werner.* —It occurs generally crystalized, also lamellar, fibrous, granular, compact, or earthy. The prevailing colours are greyish, yellowish-white, blueish-white, and red. The crystals are frequently colourless and transparent, and have a shining vitreous lustre, inclining to pearly. The secondary crystals are generally flat prisms, or tables, and they often occur of considerable size. The specific gravity varies from 4·30, to 4·37. It is brittle, and easily frangible. Its constituents are barytes 67, sulphuric acid 33. Very fine crystals of this variety are found in the lead-mines of Cumberland, Durham, and Westmoreland. *Compact* Sulphate of Barytes occurs in amorphous masses, which have a lamellar structure; also disseminated, reniform, semi-globular, with cubic impressions, and also in curved lamellar concretions. It is found in the mines of Staffordshire and Derbyshire, where it is named *Cawk*.

Sp. 2. Carbonate of Barytes, or Witherite.—Baryte carbonatée, *Hauy*. Witherit, *Werner*.—This mineral is rarely crystalized; but most frequently occurs in irregular masses, or in distinct

concretions, which have a striated or diverging flat fibrous structure. It is translucent or semi-transparent, and has generally a yellowish or brownish-white colour. It has a shining or glimmering lustre, and the fracture is resinous. It is brittle, and easily frangible. The specific gravity is about 4·30. Before the blowpipe it decrepitates slightly, and melts into a white enamel. It dissolves with effervescence, in dilute muriatic or nitric acid. Its constituent parts are, barytes 78, carbonic acid 22. It occurs in lead-veins in several of the mining districts of England and Wales. It is a very active corrosive poison, and in Lancashire and Yorkshire, where it is found, it is used for the purpose of destroying rats. Fifteen grains is reported to have killed one dog in eight hours, and another in fifteen.*

Salts of Barytes.

The soluble salts of barytes are characterised by their acrid nauseous taste, and by the copious precipitate which sulphuric acid throws down when it is added to their solutions. The only compound of this salt applied to medical purposes, is the muriate or hydro-chlorate.

MURIATE OF BARYTES.—This salt may be prepared by adding dilute muriatic acid to the carbonate of barytes, and evaporating the solution, or by decomposing the sulphate by heating it with charcoal, and adding muriatic acid to the solution obtained by washing the residue with water. The muriate in either case is procured by crystalization, and a formula is given for its solution in the Edinburgh Pharmacopœia, in which one part of the salt is dissolved in three of water. This solution is stimulant, and in large doses poisonous; but it has been strongly recommended by some practitioners as a remedy in cancer, in some obstinate cutaneous eruptions, and in scrofula, under the appellation of a deobstruent. The usual dose is from five drops, gradually increased to twenty or more.

When taken in an over-dose, the pure earth or oxide, the car-

* *Annales de Chimie*, xxi p. 119.

bonate and muriate of barytes, appear to produce symptoms similar to those occasioned by arsenic, but less violent. In such cases, some alkaline, or earthy sulphate, such as that of magnesia, or of soda, has been found to neutralize the poison, by forming an insoluble salt which exerts no action on the animal system.

SCHISTOSE, OR SLATE-ROCKS.

1. Aluminous Schistus, or Alum-Slate.—Pl. XLV. fig. 3. —This rock, which affords the greater part of the alum of commerce, is of a greyish, blueish, or iron-black colour, and often contains marine shells, and other similar organic remains. Its lustre is glistening or glimmering, or semi-metallic, and it is sometimes iridescent on the surface. The structure is slaty, and it splits, by exposure to the air, into thin plates. It is generally soft, and yields easily to the knife. It consists of clay-slate impregnated with a large portion of carbonaceous or bituminous matter, and sulphate of iron. Alum-slate forms a bed several hundred feet in thickness, at Whitby, in Yorkshire, which, according to Mr. Bakewell, extends over a great part of the Cleveland hills, and is intersected by a vertical dyke of basalt. A full account of the processes for the manufacture of alum was published by Mr. Winter, in the 26th volume of Nicholson's Journal. One hundred and thirty tons of this schistus produce, on an average, one ton of alum.

Alum, prepared according to the process adopted at Whitby, is a sulphate of alumina and potass. It is in large irregular semi-transparent colourless masses, having a vitreous fracture, and crystalizes from its solutions in regular octahedrons. It has a sweetish, acidulous, styptic taste, and from its excess of acid it reddens the vegetable blues. It is soluble in about 14 parts of water at 60°, but insoluble in alcohol. When exposed to a moderate heat, its water of crystalization is expelled, and a white, friable, opaque, spongy mass remains, named *burnt alum* (*alumen ustum*); it is the *alumen exsiccatum* of the pharmacopœias. The variety called *Roche* or *Rock alum* (*alumen rupeum*), is brought from the Levant; it is

in small fragments, efflorescent on the surface, and of a pale rose colour. Alum is decomposed by the alkalies and alkaline earths, which precipitate the alumina; and gallic acid produces the same effect.

Alum is used in medicine as a powerful astringent, and is not unfrequently prescribed both as an external and internal remedy for restraining hæmorrahgies and serous evacuations; it is thus given in obstinate diarrhœa, menorrhagia, leucorrhœa, and diabetes. It has also been employed in combination with cinchona in intermittent fevers, and conjoined with opium as a prophylactic in colica pictonum. The dose, in substance, is from five grains to half a drachm. If it excite nausea or vomiting, or operate as a cathartic, this inconvenience may generally be obviated by combining it with an aromatic. A favorite and very efficacious form of administering it, is that of alum whey (*serum aluminosum*), prepared by adding two drachms of pulverised alum to a pint of hot milk; the dose of this is three or four ounces. Externally, alum is used in gargles in cases of cynanche, relaxation of the uvula, and aphthous ulcerations of the mouth; as an injection in the latter stages of gonorrhœa, leucorrhœa, and profuse menorrhagia; and as a lotion in chronic ophthalmia, hæmorrhoidal affections and prolapsus ani. Burnt alum is sometimes used by surgeons as a mild escharotic.

Order IV.—SALINE MINERALS.

Under this class are included the mineral acids, and their combinations with the earths, alkalies, and metallic oxides. They are distinguished by their solubility in water, and sapid taste.

Genus I.—ACID.

Sp. 1. Carbonic Acid.—Spiritus Lethalis, *Pliny.* Gas Sylvestre, Spiritus Sylvestris, *Paracelsus* and *Van Helmont.* Fixed

Air, *Black.*—This gas exists in great abundance in nature, and is often extricated very largely in a variety of chemical operations. It occurs in considerable quantities in marshy places, rises from certain acidulous waters, and abounds in many caverns, particularly in the celebrated grotto Del Cane, near Naples. It is a very frequent cause of accidents in coal-mines, where it is known under the name of *choke-damp,* in breweries, in places where charcoal is burned in close rooms, and in wells, and other places that have been long shut up. In consequence of its wieght, its specific gravity being 1·5230, it remains at the bottom of those places, and proves fatal to those who incautiously enter, by causing suffocation. The bodies of persons suffocated in carbonic acid gas, exhibit the ordinary appearances of apoplexy. The most effectual means of recovering the vital actions, when suspended by this gas, consists in inflating the lungs as soon as the body is removed to the open air, in sprinkling the face, and, when the heat is above the standard of health, even the whole body, with cold water. In other respects the method of treatment will be the same as in the case of drowning or other kinds of suffocation. Those who wish for further information on the subject of this and other noxious gases, may consult the valuable "Treatise on Poisons," by Professor Christison.

Sp. 2. Muriatic, or Hydro-chloric Acid.—In its pure form Muriatic Acid always exists as a gas, and in this form it is said to emanate from volcanoes. It is the only known compound of chlorine with hydrogen, and is, therefore, very properly termed by the French chemists *hydro-chlorine gas.* It is best obtained by the action of concentrated sulphuric acid upon an equal weight of sea salt; it is given off in great purity, but must be collected over mercury. It has a strong affinity for oxygen, which, according to Sir H. Davy, at the temperature of 40, can absord 480 times its volume of muriatic acid gas. The solution thus formed is commonly known by the name of muriatic acid, or *spirit of salt.* It may be prepared by passing the gas, procured as above, immediately through water; or by adding a sufficient quantity of water to the sulphuric acid in the first instance, and then distilling. The solution, when pure, is perfectly colourless, and possesses all the

acid properties as well as of the gas. Muriatic acid has been given as a refrigerant and tonic, in typhus, in malignant sore throat, and in some obstinate cutaneous eruptions. The dose is from ten to thirty drops.

Sp. 3. Sulphuric Acid.—Native or pure Sulphuric Acid is said to be found in a concrete state, in the cavities of some volcanic mountains; it is also observed trickling from the roofs of caves in Ætna, near Aix in Savoy, and various places in Italy; but as an article of commerce it is usually obtained by burning a mixture of about eight parts of sulphur, and one of nitre in close leaden chambers, containing water, by which the fumes, as they rise, are successively condensed; and the acid is procured in a concentrated state by evaporation of the solution. The hydro-sulphuric acid, or *oil of vitriol,* is a colourless, oily fluid, of a specific gravity, when concentrated of 1·85. It boils at 620°, and freezes at 15°. It is acrid, extremely caustic, and quickly decomposes animal and vegetable substances. It rapidly absorbs oxygen from the atmosphere, and may be combined with water in any proportion. Though largely diluted its taste is intensely sour, and it instantly reddens the vegetable blues. It readily combines with the alkalies, and with alumine, and with some of the metals forms soluble native salts, all of which, except the sulphate of soda, are precipitated from their solutions by carbonated alkalies. Medicinally, this acid is a useful refrigerant, antiseptic, and tonic. As an astringent, it is frequently prescribed to check the discharge of blood in hæmoptysis, and the colliquative sweats in hectic fever. It is also used in menorrhagia and diabetes; and as a tonic in dyspepsia, low typhoid fevers, convalescencies, cutaneous eruptions, and confluent small-pox. It is a very common adjunct to gargles in cynanche; and as an external application, mixed with lard in the proportion of half a drachm to an ounce, it has been used with advantage in scabies. The dose of the diluted acid (*Acidum Sulphuricum dilutum*) may be from 10 to 30 drops in any of the common bitter infusions or decoctions.

Sp. 4. Nitric Acid.—This acid has not been found in a pure state in nature, but is generally obtained from the nitrate of potass, by the action of sulphuric acid. Nitric acid is a colour-

less, transparent fluid, extremely corrosive, and emitting, when exposed to the air, white fumes. It acts powerfully on animal and vegetable substances; when applied to the skin, it tinges the cuticle yellow, and causes it soon to peel off; when poured on the volatile oils, it immediately sets them on fire; when digested in sugar, it converts it into oxalic acid: it is capable of oxidizing all the metals, and combines with the earths, alkalies, and metallic oxides, forming a peculiar class of salts, which have been called nitrates. The nitric acid, as it occurs in commerce, is well known under the name of *aqua fortis*; it is of a deep orange-colour, and is generally contaminated with the sulphuric and muriatic acids. For the purposes of medicine, nitric acid is kept in a diluted form (*Acid Nitricum dilutum*, Ph.) in order to admit of its dose being easily regulated. In this state it may be given in doses of from 10 to 40 drops, in a glass-ful of water, compound infusion of roses, or in any of the bitter vegetable infusions, especially those of cinchona or of gentian. Its effects are those of a refrigerant, tonic, and antiseptic. It has been advantageously administered in some dyspeptic affections, with a view of relieving violent sickness and anorexia, in chronic hepatitis, in obstinate cutaneous eruptions, in low typhoid fevers, and as an adjunct to mercury in the cure of syphilis. Speaking of its use in the treatment of the venereal disease, Mr. Brande justly observes, "although in such cases it may be occasionally efficacious as a tonic, it is by no means to be regarded as possessing any direct influence over the disease corresponding with that of mercury. In some cases of eruptions, and in ulcerations of the legs, an alterative course of medicine, consisting of nitric acid and small doses of mercury, has been found of service." Externally, nitric acid is sometimes used for destroying warts and other cutaneous excrescences; it has also been strongly commended by some writers, as an escharotic, in cases of hospital gangrene. Two or three drachms of the diluted acid added to one pint or more of water, forms an excellent application to certain ill-conditioned sores and ulcers.

Sp. 5. Boracic Acid, or Sassolin.—This acid occurs in scaly crusts. Its taste is harsh and sub-acid. Its colours are white, or yellowish-white. It is found on the borders of hot

springs, near Sasso, in the territory of Florence, and also in Volcano, one of the Lipari islands.

Genus II.—CARBONATES.

Sp. 1. Natron.—Nitrum, *Plin. Hist.-Nat.* xxi. p. 46.—The native carbonate of soda, or natron, of which there are two species, the common and the radiated, is found abundantly in various parts of the world, particularly in Hungary, and in Egypt. It occurs forming an efflorescence on the surface of the soil, or on certain rocks; it is also found on the bottoms and sides of lakes that become dry in summer. In Hungary, according to Ruckert and Parmand, there are so many natron lakes, that 50,000 quintals of soda could be obtained from them annually. Its colours are yellowish and greyish-white. When compact, the structure is granular or radiated, and the lustre vitreous; by exposure to the weather it becomes dull, friable, and opaque. It is largely employed in the manufacture of glass and soap, and when separated from impurities by lixiviation and crystalization, it is used in medicine as an antacid.

Genus III.—MURIATES.

Sp. 1. Rock-Salt.—Common Salt.—This substance is found in a solid state, forming, in some places, immense beds, and in others large mountains. Its most common colours are white and grey; it also occurs of various shades of red, yellow, brown, blue, and green. It varies from transparent and translucent to opaque; the lustre is shining and vitreous; it occurs massive, disseminated in crusts, stalactitical, and crystalized in cubes and octahedrons. The structure is indistinctly laminar, it is rather brittle, and easily frangible. The specific gravity is 2·14. It yields easily to the knife. When exposed to the air, it slowly deliquesces. The

rock-salt of Cheshire yielded in 1000 parts, muriate of soda 983, sulphate of lime $6\frac{1}{2}$, muriate of magnesia $0\frac{3}{18}$, muriate of lime $0\frac{1}{10}$, insoluble matter 10. *Henry.*—The principal deposit of salt in this island is that of Cheshire, near Northwich, where there are two beds, of which the uppermost is forty-two yards below the surface and twenty-six yards thick. Rock-salt also occurs at Droitwich, in Worcestershire; but all the salt manufactured there is said to be procured from springs which rise to the surface. The most celebrated salt mines in Europe are at Cardona in Spain, and in Poland. Rock-salt is also found in vast quantity in various parts of Asia, Africa, and America. The waters of the ocean contain about two and a half per cent. of salt. The uses of this salt in pharmaceutical chemistry are very various and important. It affords muriatic acid and soda by certain chemical processes. When taken to the extent of half an ounce or more, it acts as a cathartic; and, dissolved in gruel, it forms the active ingredient in the common domestic enema. Externally, strong brine is sometimes beneficially applied to indolent glandular tumours, as a discutient.

Sp. 2. Muriate of Ammonia, or Sal Ammoniac. This salt is a volcanic production, occuring in fissures, or on the surface of volcanic rocks, and in the vicinity of beds of coal that have been on fire. It is generally of a yellowish or greyish-white colour; it occurs massive, incrusting and crystalized. The greater part of this salt used in medicine is prepared artificially. As an article of the materia medica, it is chiefly limited to external application, as a discutient.

Genus IV.—SULPHATES.

Sp. 1. Sulphate of Soda.—This salt occurs in the form of efflorescent incrustations, on rocks and old walls, and dissolved in the waters of lakes. It has long been known under the name of *Glauber's Salt,* and is prepared by various processes on a large scale. It has a peculiarly bitter nauseous taste, and is less active as a purgative than the sulphate of magnesia. Its medium dose is ℥iss. dissolved in water.

Sp. 2. Sulphate of Magnesia.—This salt well known by the name of *Epsom Salt*, sometimes forms an efflorescence, and is contained in various mineral waters, as in those of Epsom in Surry, whence it has been extracted, but at present it is principally obtained from the liquor remaining after sea-water has been boiled down for common salt. It is used as a cathartic in a dose of from ℥i. to ℥ii. dissolved in any proper vehicle.

The remarks made upon the other native sulphurets, as those of iron, copper, and zinc, in a former part of this work, render any further observations superfluous.

Genus V.—NITRATES.

Sp. 1. Nitre, or Nitrate of Potash.—This salt occurs forming incrustations, and in groups of capillary crystals on the surface of the soil and on rocks. It is found in great abundance in various parts of Europe, Asia, and Africa. The nitre used for the manufacture of gunpowder in the United States of America, is said to be obtained from an earth collected in the limestone caves of Kentucky. It is brought to this country in an impure state from India. It is purified by repeated solution and crystalization. As a medicine, this neutral salt is sometimes prescribed as a diuretic, but more commonly as a refrigerant and sedative in all inflammatory complaints, excepting those of the urinary organs, in active hæmorrhagies, and in herpetic eruptions. It is given in the dose of from 5 to 20 grains, repeated every four or five hours. In very large doses, as from ʒss. to ʒi. for instance, it occasions violent nausea and pain in the stomach, vomiting, spasms, and bloody-stools, and sometimes proves fatal. In such cases, mucilaginous drinks, general and local bleeding, and opiates, are the most effective remedies.

Genus VI.—BORATES.

Sp. 1. Borate of Soda, or Borax.—Sodæ Boras, *Ph*. Sal Sedativus, *Homberg*.—This salt is chiefly brought from Thibet and

Persia, where it is found in large quantities, being dug from lakes and springs, in which it is spontaneously deposited. It is in crusts or amorphous masses, and sometimes crystalized. The colours are white, greenish-white, and brownish-grey. The lustre internally is shining and resinous, it is semi-transparent and refracts doubly. It has a styptic alkaline taste, and is soluble in about 20 parts of water at 60°. It is soft and easily frangible. Its constituent parts are, Boracic acid 34, soda 14, 50, water 47. *Bergman.*—In medical practice, Borax, though once highly extolled as an emmenagogue and diuretic, is not now given internally. It is principally employed in the form of solution, in water, and combined with honey and tincture of myrrh as a useful detergent application in aphthous ulcerations of the mouth and tongue.

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Diggens and Jones, Printers, Leicester-street, Leicester-square.